



COAL AGE



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GETTING ON

TODAY we write with a steel pen and dry the ink with a blotter—formerly we used a quill and waved the paper in the air. We can now communicate with Peking in an hour—it used to take a year. We can go a thousand miles practically overnight, sleep in comfort and live on the best in the land—the same journey once required a month. Mothers used to bring up their own children—now the job is left mostly to strangers. For recreation, our tired business man would saw wood or go hunting—now he chases a little white ball over a 60-acre lot. When a fellow finally lands near the ladder's top, the doctor takes charge of him and he is put on an oatmeal diet for the rest of his sorry life. This is a great age—an era of marvels. Could our forefathers return and see us, they would hang their heads, acknowledge they were "pikers," and blushingly retire to oblivion. However, though times have changed and the ways of doing things are different, the same principles underlie success now as was the case 100 or 1,000 years ago. Men succeed today for the same reason they did in all of our yesterdays. Truth has not changed; neither has honesty, energy, perseverance, fidelity, charity and all the other fundamentals of a proper existence. The passing of time has

only proved that methods have changed, not human morals.

We must do the work we are qualified to perform. General Grant was one of the greatest military geniuses the world ever knew, but a

MEN succeed because they take pains to succeed. The element of luck doesn't enter into such calculations. We must believe in the thing we do, whether it is selling a pair of suspenders, driving a mule or managing a mine. Conviction convinces — sincerity compels. And this goes for the mule just mentioned as much as for the suspenders or the mine.

rank failure in business. Appomattox was his Austerlitz, but Wall Street his Waterloo. Were it not for his biography, written when his life was fast ebbing away, his family would have been left in a dependent condition.

Most men owe success to the fact that all props were knocked out from under them. If we are always seeking the help of others, we will never be able to ride out the storms

that besiege us. Being born a nobody is generally a blessing. Columbus was the son of a weaver; Homer, of a small farmer; Demosthenes, of a cutler; Franklin, of a soap boiler; Shakespeare, of a wool stapler. Robert Burns was a plowman; Napoleon came from an obscure family in Corsica; Lincoln was a rail splitter; Grant, a tanner; Garfield, a towboy on a canal. Cornelius Vanderbilt started with \$50 given him by his mother, A. T. Stewart swept out his own store, and John Jacob Astor sold apples in the streets of New York.

A weak man by concentrating his powers on a single object can accomplish more than a strong man who devotes his attention and time to many things. Much of our trouble is due to not knowing our own desires and not properly understanding our own aims. There is an old saying: "He who pursues two hares at once does not catch the one and lets the other go."

There are many essentials to success, but the greatest is will power. The will to labor is even more necessary than the power to achieve. Brains are secondary to a fixed determination. One writer gives these three secrets of success: Piety, Probity and Perseverance—a gracious soul, a blameless life and a forceful will. The last is not least.

EVERYTHING IN MANKIND IS HABIT, EVEN VIRTUE ITSELF.

At first we carry our habits; later they carry us. Long ago a wise man said: "Sow an act and you reap a habit; sow a habit and you reap a character; sow a character and you reap a destiny." We must fight and conquer ourselves. No man ever drifted upstream. Success lies below the surface, and to find it we must dig.

Failure Through Carelessness

[Knowing where and how others have failed is just as essential to individual success as a knowledge of how to succeed. A recent Foreword in *Coal Age* called attention to a serious accident resulting from carelessness and indifference to mine rules. In publishing the Foreword mentioned we suggested that our readers submit accounts of accidents due to carelessness that had come to their notice. The following short articles are in response to our request and should be both interesting and helpful to all mining men. We invite still other readers to send us accounts of accidents that might have been avoided had not carelessness prevailed.—Editor.]

Shotfirer Kills Eighteen Men

By U. S. WILSON

In a certain dusty mine that generated gas a disastrous explosion occurred, resulting in the death of 28 men. After this accident the mine was put on the locked safety-lamp system, and shotfirers were appointed to fire all shots, these shotfirers not being allowed to enter the mines to shoot places until all the men were safely outside the mine.

This rule was lived up to for some time. In the course of a few months, however, the shotfirers began to enter the mine before all the men were on top. The result was that they began shooting holes before the men got out of the mine. Here's the result:

One evening a shotfirer set off an explosion which not only killed himself and another shotfirer, but also 16 other men who had not reached the surface, and would have killed 100 if they had been in the mine. The explosion was so terrific that it rattled windows in the homes of people a mile from the mouth of the mine. Is not this a fair example of the death and disaster that are sure to result eventually where carelessness prevails, and does it not prove the worthlessness of a rule unless the rule is enforced?

Failed To Place Timbers

By PENNSYLVANIA SUPERINTENDENT

A miner with years of experience had driven a chamber for 150 ft. with a very good roof which had required little or no timbering. The assistant foreman on one of his morning examinations found a change in the condition of the roof at the face. He also discovered that the miner had gone home on the previous day with about enough loose coal to load a car. He notified the miner when he arrived at the fireboss' station to report for work, to stand two sets of timbers before cutting or loading any more coal at the face. The assistant foreman, after he had passed his men, proceeded to the chamber in question and instructed the driver not to give any empty cars to the miner. He had already attended to the sending of the suitable timbers to the place.

The car containing the props was placed just outside the bad roof, and the miner and his laborer proceeded to place them. The mine foreman, to whom the assistant foreman had reported the condition of the place, visited the miner during the day and found him standing the

timber in accordance with the assistant foreman's instructions. He again warned him not to work at the face until the bad roof had been secured.

On his round on the following morning the assistant foreman found that one set of timber had been satisfactorily placed and apparently nothing done at the face. The miner on entering the mine was again warned to stand the second set before he attempted to do any work at the face. He proceeded to his place and was cutting the hitches for the timber when the assistant foreman arrived. Shortly after the latter left the place, however, he unloaded the timber from the car, then he and his laborer concluded to load the coal at the face into the car and to stand the timber later. They undoubtedly had concluded that the assistant foreman would not come in again until tomorrow; that the roof had stayed up now for several days, and as it had been good all the way up the place, would stay up until they loaded the loose coal; that their earnings for the day would perhaps be a little better for the car of coal than for the timber.

They had only partly loaded the car when the roof fell. The miner was horribly crushed and the laborer seriously injured. "Another broken rule" had deprived another family of husband and father. Another life had been added to the number of fatalities which swells the percentage of fatal accidents due to roof falls. Mr. Miner, Mr. Laborer, does it pay?

Neglect Results in Man Being Badly Scalded

By A. S. HELPER

One Saturday evening on coming out of the mine I met the foreman. He stopped, hesitated a moment, and then said to me: "Will you fire for us to-night? Our night man is off duty. There won't be much to do, as we are putting one boiler off to be cleaned tomorrow." I said I would, and went home, got my supper and reported at 6 o'clock for duty.

It took the dayman about two minutes to inform me that No. 1 boiler was to be put out. I was to draw the fire, cut it off from No. 2 and let the steam go down until it did not show on the gage before I opened the blowoff valve. I followed his instructions to the letter; opened the blowoff valve and then went back into the boiler room (the valve was outside, and it was very cold, being in the winter). When I thought the boiler was drained, I went out again to see, and there was not a drop on the blowoff pipe, so I concluded it was empty.

I then got a short plank, placed it in the firedoor, got a monkey wrench and torch, opened the smokestack doors, walked up this plank, set the torch down on my left, took the yoke off the manhead and tapped the head slightly to see how tight it was. The head fell in, and the water gushed out, striking me on the breast and knocking me backward off the plank. As this rushing water came down over me, it put my torch out and left me in the dark. I kept my presence of mind, and got to a place where the water could not reach me. Was I scalded? Yes, too horribly for me to attempt to describe. The reader may imagine.

The cause was a piece of scale which had worked over the blowoff pipe where it entered the boiler, sediment collecting around it so that the water could not drain out of the boiler. The firemen had been unable to blow down the water in this boiler for some time. Hence the necessity for blowing out the boiler.

Here's the lesson: If the dayman had told me of this condition and had left it to my own knowledge, I should have opened the blowoff valve when the steam gage showed a pressure of 10 to 12 lb. That would have forced the sediment under this piece of scale, and the boiler would have been drained. This is not the best boiler practice under normal conditions, but it is often wise to meet an abnormal condition with an unusual practice.

Took a Chance and Lost

BY RICHARD ROWLAND

On Jan. 22, 1916, I was a driver in the mines and hauled coal from the day shift working in a place where the men were taking a stump out by pickwork. These day miners left the roof in a bad condition when they had finished their shift.

The night shift came in immediately, and seeing a chance to get pick coal for which they get 72c. per ton, they took the risk, and instead of starting a new machine place they started to load a car.

As soon as they commenced to dig at the stump, the place started to work, and the props began breaking around them. This caused them to vacate the place, leaving the loaded car and tools behind. But as the place did not cave immediately, they came to the conclusion they would go back and save the car and the tools. They gambled with death and lost; for as soon as they started to push the car, two men in front and two behind, the rock came down and buried the two men who were at the rear end of the car.

By superhuman efforts they were taken out alive. One of them, James Warner, I helped home to his heart-broken wife, where he died ten minutes afterward, and the other, John Rowland, is crippled so badly that he is walking with the aid of crutches.

Every day in the mines you can see men risking their lives, not because the mine foreman advises them to do so, but because they prefer risking their lives and penalizing their families for the sake of getting a few extra paltry dollars.

Death Results from a Broken Mine Law

BY F. B. HICKS

I wish to relate a real happening that caused death to a miner and injury to his laborer at the Delaware & Hudson Coal Co.'s No. 5 mine at Plymouth, Penn., some time ago. A miner broke rule 30, article 12, of the Anthracite Mining Law.

He worked in the next chamber to me. It was the second hole he had blasted that day. I was in his chamber when he finished loading and tamping the first of the two holes.

This miner had no scraper to clean out his holes. Such a device would have cost him 25c. at a supply store. He was in the habit of cleaning his holes with the head of his drill, but this method does not clean all the fine dirt from the hole.

I told him then he was breaking the mining laws and explained the danger he was in, but he only laughed and said, "When you have worked underground as many years as I have, you will know how to mine coal." I was a young miner, he was an old one.

He drilled the second hole and made up the powder; the blast was in the crosscut. He told me he was going to shoot, and I retreated to the gangway. When I heard the shot, knowing he did not have time to tamp the hole, I ran up to him, only to find him with the drill right through his stomach and almost every bone in his body broken.

He had tried to ram powder back in the hole with the drill when the cartridge was tightened with fine dirt. When I reached him he was still conscious, and the last words he said in the ambulance on his way to the hospital fifteen minutes before he died were, "Hicks, if I had only listened to you!"

Killed by Fall of Top Coal

BY CHIEF ENGINEER

Here is another fatality added to the ever-increasing list of those caused by carelessness.

A miner who had been working in the same breast for two months, who knew the exact conditions of the place and just what he should have done under those conditions, ignored them and met his death.

The shots at the face had failed to bring down the top coal. This is often loose, and the miner knows that it should be carefully sounded before any work at the face is attempted.

This man, without bothering to make an examination of the top coal, started to drill his hole, and the coal being loose, it fell on him, killing him instantly.

How can such accidents be avoided if the miner will not profit by his knowledge, teaching and experience?

Returned to Shot Too Soon

BY SAMUEL JONES

In the year 1900, in the Elk River shaft, Punxsutawney, a man by the name of Geary lost his life and his partner narrowly escaped the same fate. It was near time for changing shifts, and they had drilled two holes in the bottom of the solid rock. In order to save time they lit both fuses at once, going back to wait the results. One shot exploded, and Geary, never waiting for the second shot to go off, rushed back, thinking it had missed. He was just reaching down to pull out the fuse when it went off, tearing him to pieces. He lived a short time, but never regained consciousness.

This is one case where five minutes' time would have meant one less accident, one life saved and for many relatives and friends joy instead of sorrow. Such instances should convince all miners that a few hours, let alone minutes, will often prove a profitable investment.

Using Corliss Engines with Fuel at 40c. Per Ton

BY S. W. SYMONS*

SYNOPSIS—The installation of cross-compound corliss-engine-driven two-stage compressors in the place of the straight-line machines which had been installed only a short time before resulted in appreciable savings in coal, in labor and in boiler capacity.

Many coal operators consider that a low fuel cost is sufficient reason for installing low first-cost equipment regardless of the operating economy to be expected.

This is particularly to be noted in the case of the much-abused air compressor. Reliability was and still is considered a factor of prime importance, and the "old reliable" straight-line simple-engine-driven compressor was almost invariably chosen.

Of late years operators have come to realize more and more that the high-class duplex type, with compound steam cylinder and corliss-valve gear and two-stage air

breaker of the Kingston Coal Co., where there were two tandem-compound Meyer valve compressors, each having a rated capacity of 2,600 cu.ft. of free air per minute. The master mechanic made the statement that they were constantly installing boilers at this particular place, as their compressors were extravagant users of steam. The salesman suggested that instead of buying boilers they should buy an economical air compressor and save the expense of extra boilers and the continuous handling of coal. To drive the argument home, cards were taken from the compressors and a statement made of the saving that could be expected.

THE COMPRESSORS HAD BEEN INSTALLED RECENTLY

The master mechanic stated that the compressors had been installed only a little over three years and it would not be possible to get his company to throw them out and purchase new ones.

For 16 months the salesman continued to pound the Kingston company in an endeavor to secure the installation of a single corliss unit in place of the two straight-line machines, using operating economy as the "big stick," until finally an order was placed for a 30-in.-stroke corliss compressor having compound steam cylinders of 20 and 38 in. diameter and two-stage air cylinders of 20 $\frac{1}{4}$ and 33 $\frac{1}{4}$ in. diameter. The machine when operating at 120 r.p.m. has a rated capacity of 3,336 cu.ft. to 100-lb. pressure. The order was finally placed and the machine installed and put in operation.

The mechanical engineer of the Kingston Coal Co. relates the incident that he was in the compressor house when the new compressor was turned on to carry the load and the two discarded compressors were shut down, and that after it had been in operation about 30 min., the foreman of the boiler house rushed up to the compressor house window and exclaimed, "What in h— is going on here? Aren't you going to run the compressors today?"

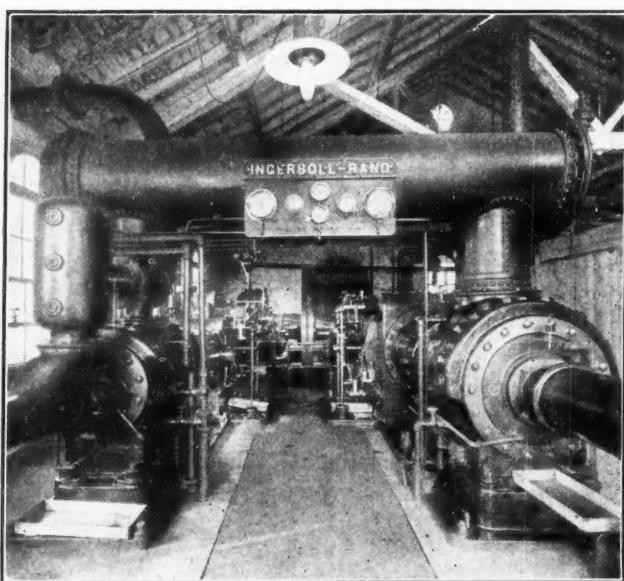
THE RECORDS SHOW RESULTS ATTAINED

After about two months of operation the following data, taken from the master mechanic's records, were submitted:

The records show that the company has been able to shut down three 300-hp. B. & H. boilers. In the working day of 24 hr. it was able to save 48 tons of coal per day, which is valued at 40c. per ton, making a saving of \$19.20 per day on coal. The water meters show that it is saving \$1.41 per day on water. It saves \$5.28 on labor, making a total of \$25.92 per day saved. As this plant operates continuously for 365 days per year, it makes a total net saving of \$9,460.80 per year. In addition to this it has been able to dispense with \$21,000 worth of boiler plant. It figures that the new compressor, installed on the foundation, cost \$13,500.

The compressor was at first operated noncondensing, but later a condensing plant was installed, resulting in a still greater saving.

This company has recently installed a duplicate of this machine and also an Erie City Lentz engine, which shows that it realizes thoroughly the saving that can be obtained by the installation of economical equipment, even in a region where coal is valued at only 40c. a ton.



THE NEW COMPRESSOR IN OPERATION

conds. will give equally if not more reliable service, together with a degree of economy so far ahead of the straight-line machine as to warrant its installation when fuel is even as low as 40c. a ton.

An instance of particular interest is that of the Kingston Coal Co., at Kingston, Penn., which some time ago discarded two straight-line tandem-compound compressors (which had been in use only four years) and replaced them with a single duplex corliss machine with compound steam cylinders and two-stage air cylinders.

This installation is of interest to the coal operator, since it shows in round numbers the saving made possible by the installation of refined, up-to-date equipment.

Several years ago a consulting engineer—a salesman representing the Ingersoll-Rand Co.—stopped at the No. 4

*New York, N. Y.

How Two Pumps Effected Cost and Efficiency

BY J. J. O'CONNELL*

SYNOPSIS—The centrifugal pump, both underground and in the boiler plant, proved in service that it could effect decided savings in initial cost and in operating expense. Other considerations, such as convenience and ease of inspection, were also in favor of the centrifugal unit.

The cost of mine drainage is one of the biggest problems in coal mining. Its successful solution means a lower production cost and a greater tonnage.

Until recent years reciprocating piston or plunger pumps were employed for this work. The advent, however, of low-cost electricity and its increasing application for power transmission in mining work, together with its ease of installation and flexibility, as well as the small maintenance expense of the system, have resulted in the development and successful adoption of centrifugal pumps to meet coal-mining conditions and requirements.

The chief advantages of this type of pump are large capacity, absence of complicated parts, economy of space, lower cost of installation and maintenance, greater efficiency and economy.

Until July, 1914, the West End Coal Co., of Mocanaqua, Penn., has used reciprocating pumps, but decided to test the value of centrifugal machines in mine drainage.

*New York, N. Y.

When the third level of the Lee drift, similar to that shown in Fig. 4, had been reached, it was found necessary to install a pump with a capacity of 400 gal. per min. against a 110-ft. head. To meet these conditions with another duplex center-packed plunger pump, similar to that already installed on the second level, would require a size 14x8½x10 in., having overall dimensions of 8 ft. 4 in. in length, and 3 ft. 2 in. in width and weighing approximately 5,400 lb.

To install a triplex pump similar to the one employed in the first level would require a size of 9x10 with overall dimensions 5 ft. 3 in. wide, 9 ft. 10 in. long and 9 ft. 10 in. high, weighing about 5 tons. Furthermore, the water in this mine was quite acidulous, necessitating the use of a pump having the water end made of acid-resisting bronze or similar material, which would considerably increase the cost.

ESTIMATES FAVORED THE CENTRIFUGAL PUMP

Estimates proved that a decided saving could be effected by installing a 4-in. single-phase double-suction Cameron centrifugal pump, operated by a 35-hp. motor at 1,600 r.p.m. This pump only occupied a space 5 ft. 11 in. long, 2 ft. ¼ in. wide and 2 ft. 3 in. high, the weight being 3,120 lb.

As the power to operate this pump was received through wires, it was easily installed, since there were no steam, air or exhaust pipes that had to be connected to it.

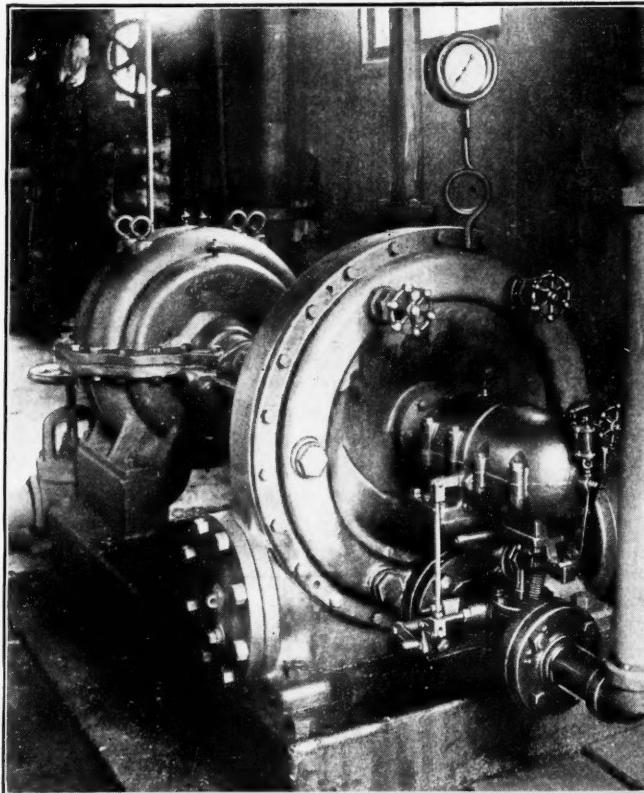


FIG. 1. THE TURBINE-DRIVEN BOILER-FEED PUMP

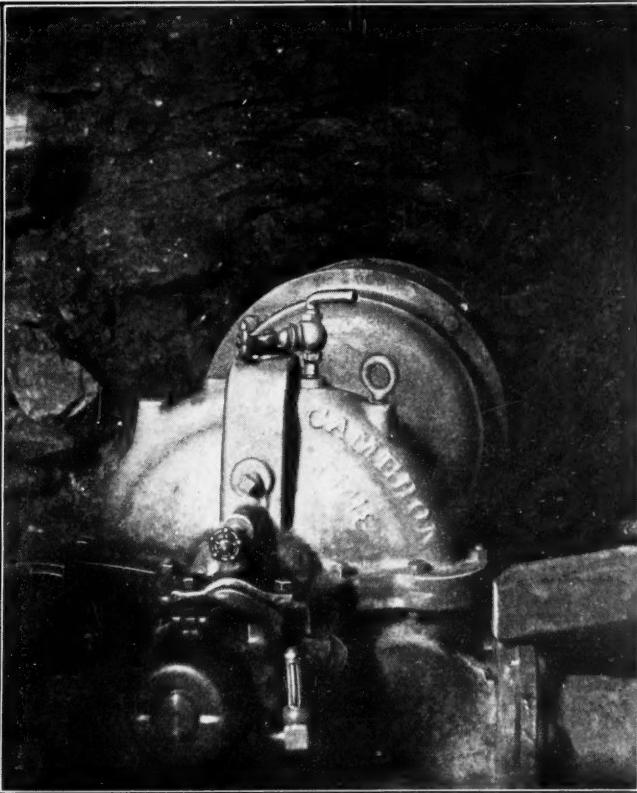


FIG. 2. THE MOTOR-DRIVEN MINE-DRAINAGE PUMP

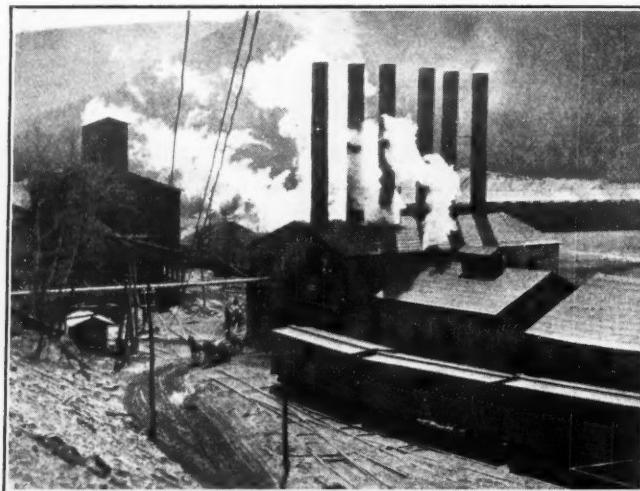


FIG. 3. THE POWER PLANT

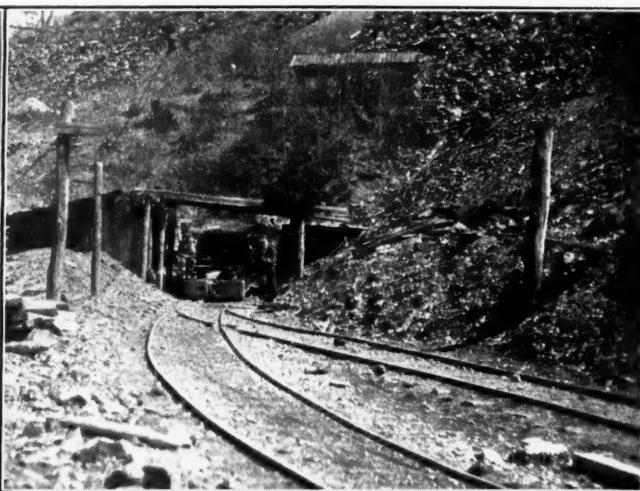


FIG. 4. THE MINE DRIFT MOUTH

All of the advantages expected from this installation, as described, were more than realized in operation. The pump not only gave the rated output of 400 gal. per min., but when necessary gave 20 per cent. greater capacity. After a year's service, a close examination showed that despite the acidity of the water, the impellers, bearings and inside of the casing were in excellent condition, and the pump is still giving a high efficiency.

There was also a decided decrease in the cost of maintenance with this pump, since it merely required an occasional change of packing and could be quickly examined.

A BOILER-FEED PUMP WAS INSTALLED

The mine management was so well pleased with the result secured from this pump that it favorably considered the installation of another similar unit for boiler feeding. At this boiler plant no fresh water is available, since that of the Susquehanna River is strongly diluted with acid at this point. A suction line was consequently laid across the river bottom to a small creek on the opposite side. The water from this creek was pumped to a large tank at the head of the breaker, similar to that shown in Fig. 3. From this tank it flowed by gravity through a pipe line about 2 mi. long to a reservoir near the boiler plant.

A 14x8½x15-in. duplex pot-valve outside-packed plunger pump was being used at this plant. This occupied a space 12 ft. 1 in. long by 3 ft. 3 in. wide and weighed 9,000 lb. This machine developed 32 hp. and used 120 lb. of steam per horsepower per hour.

A careful comparison proved that this work could be done by a 2½-in. three-stage turbine-driven centrifugal pump operating at 2,500 r.p.m. with a steam pressure of 120 lb. and a back pressure of 5 lb. The capacity was placed at 200 gal. per min. against a 430-ft. head. This pump received its water under a head, forced it through a closed feed-water heater which was provided with 400 ft. of 3-in. pipe and then forced it 200 ft. farther to a battery of four boilers having an aggregate horsepower of 1,800.

The steam turbine consumed 2,460 lb. of steam per hour as against 3,840 lb. by the duplex plunger pump, making a saving in steam consumption of 1,380 lb. per hour, 33,100 lb. per day of 24 hr., or practically 36 per cent.

The space occupied by the centrifugal unit was 8 ft. 2½ in. long, 2 ft. 3 in. wide and 3 ft. 1¾ in. high. The weight was 2,400 lb. This unit is shown in Fig. 1.

This pump has now been in operation night and day for a year and a half and has not only proved to be a profitable investment in so far as the initial cost is concerned, but has been the means of saving at least \$25 per month in oil and packing, besides the big saving in steam consumption noted. To these must also be added the saving in carrying fewer repair parts, the easier installations and control and the steadier flow.

Another feature that has saved the pumpmen much time and annoyance is the fact that this unit is throttled on the discharge line in the boiler room. When the reciprocating pump was in use, it was necessary for the attendant to run to the pumphouse several times a day and change the speed of the pump in order to care for the varying loads on the boilers.

Both of these installations proved to the satisfaction of the mine management that the modernly designed, substantially and accurately built centrifugal pump has many advantages over large reciprocating piston or plunger pumps. Chief among these is the lower initial and operating cost as well as a lower power expense.

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Mortality of Draft Animals in Great Britain

The horse and pony mortality in the mines is made a matter of official record in Great Britain. In 1914, out of 70,396 animals 1,529, or 2.17 per cent., died from injuries, and 1,470, or 2.09 per cent., were destroyed by order in consequence of an injury. Disease (including old age, from which 54 died) carried off 826 animals, or 1.17 per cent., but in addition 1,045 animals, or 1.48 per cent., were destroyed because of their diseased condition. Of this latter number 321 were slaughtered because of old age or blindness. This constituted 0.4559 per cent. of all the animals in the mines. Summarizing, the deaths due to accidents were 2,999, or 4.26 per cent., and those due to disease 1,871, or 2.66 per cent. The total death rate was 4,870, or 6.92 per cent.

In addition to these facts the Home Office tabulates the number of accidents to mules where they are neither fatally injured nor destroyed. These numbered 10,878, or 15.45 per cent. Added to this, 206 cases of ill-treatment, or 0.29 per cent., were returned. In the year before, the animals were more frequently abused, the percentage being 0.67.

The Means of Weighing Coal

In the past it has been the custom to pay for the mining of coal on the basis of screened weight; that is, the weight of the coal after the slack has been removed. For this purpose a tipple has been employed, which was so constructed that the mine car discharged its coal upon an inclined screen. The coal flowing by gravity slid into a basket directly over the railroad car. Between the basket and floor of the tipple a scale was interposed,

quantity of coal passes daily over the scales, and several attendants are required to keep the weighing operation moving without interruption.

The time required to shift poises on the beam, read the weight and record the same on the weigh sheet is considerable, and it has been an object for which inventors have striven to make this operation automatic. The results thus far obtained have not been entirely satisfactory. There are legal objections to this manner of weighing, as the courts have not yet declared that automatic weigh-

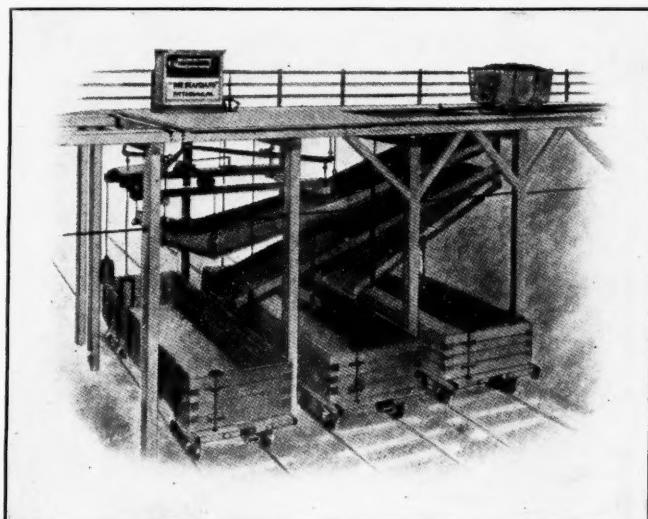


FIG. 1. TIPPLE WITH SCALES AND WEIGH PANS

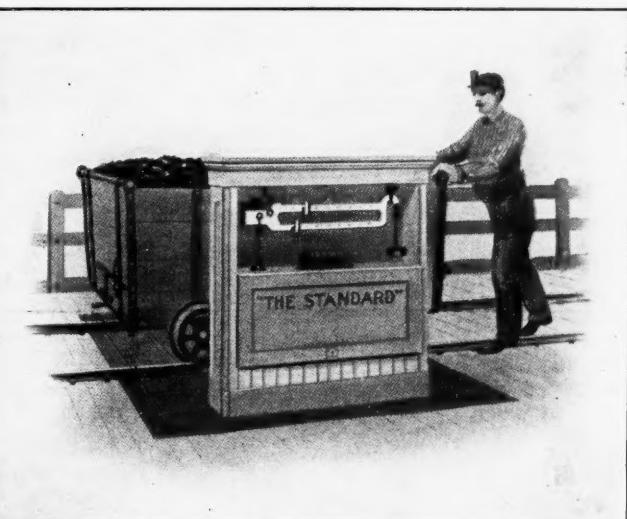


FIG. 2. SCALES FOR WEIGHING RUN-OF-MINE COAL

supporting the basket containing the lump coal by its four corners.

A simple form of this tipple is shown in Fig. 1. This shows a suspension coal-tipple scale for weighing coal in baskets or pans. This type of scale was introduced by the Standard Scale and Supply Co., of Pittsburgh, Penn., in 1893 and has been used extensively since that time in the coal field.

A large portion of the coal used in the United States has been and still is unscreened, and the operators supplying such a market for run-of-mine coal require a less extensive installation than the one just described. For this purpose a scale of the platform type with the mine track crossing the platform has been employed, each car of coal being pushed by an attendant onto the scale platform, where it is weighed and the weight recorded prior to dumping.

This type of scale is shown in Fig. 2. As may be seen in the illustration, the weigh beam is located close to the platform. A double beam permits of setting tare weight on the lower beam, while net weighing of coal is done with the upper beam and the weights at the beam's end.

Under the recent wage agreement between the operators and miners, all coal must be weighed as mined. Platform scales of some sort must consequently be installed at a point where the dumping mechanism is located. In mines employing a large number of men, a considerable

ing machines are infallible. In case of contest concerning the weight, there is no witness under this method. Furthermore, many mechanical objections are encountered which, when even satisfactorily overcome, make the initial investment high. The future may, however, bring forth an automatic and recording scale free from present defects.

Accuracy in coal weighing is essential, since the payroll is made up from the weight taken on the scale. The addition of weight to any individual mine car gives the miner only a slight advantage on each car, but the aggregate excess of imaginary coal often places the operator in bad reputation with the trade when really no ill intention exists. Inspection and testing of the scales at least every other day prevent such trouble.

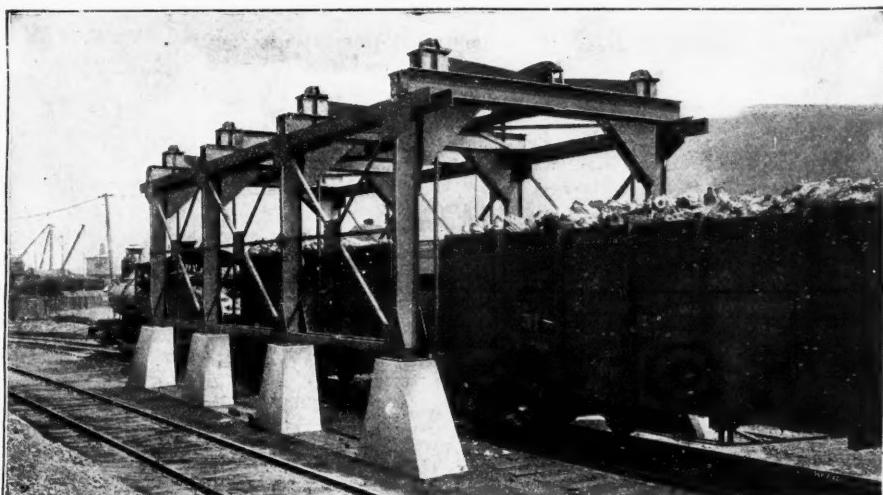


FIG. 3. TRACK SCALES FOR WEIGHING COAL IN RAILROAD CARS

There is also another method to protect the interest of the operator; namely, to check the weight as recorded by the weigh sheet by weighing the loaded railroad cars upon a track scale. This scale should be so located that the tare weight of a car can be taken before loading and the gross weight before shipment. The net weight will of course be the difference between the gross and tare.

One of the most convenient scales of this type is shown in Fig. 3. It consists of an overhead suspension frame, carrying the railroad track upon a platform. The lever system is arranged in the upper part of the structure. Eight depending rods carry the free-swinging platform, which is built of steel with a wooden cover. The cost of installation is less than that of many other designs now on the market, and the experience of many operators with this device has shown results superior to records on hand.

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The Two Cobblers

Side by side they worked in a cobbler shop, Bill and Jake. Bill was very talkative and often ceased work to enlighten his fellows on some woe of the world or another. Jake, though, was the proverbial shoemaker and stuck to his last.

Across the street a large building was in course of erection, and Bill would cease periodically from toil to watch the mechanics. As he glanced out one day he exclaimed:

"Say, Jake, see that well-dressed man in the fine auto givin' orders? That's Struthers, the contractor. He's rich and makin' more all the time. He's sure some lucky guy!"

"Is he?" ventured Jake, busily pegging away, hardly even sparing the time to look up.

"Is he?" continued Bill. "I know it. I know the time Joe Struthers was only an ordinary bricklayer, slapping bricks and mortar around like that whole gang over there now. Whaddye call it if it isn't luck?"

If Jake had any other name for it he didn't say. He was too busy with his present work and his thoughts.

The years went by, just as they have a habit of doing. We see the same shop. Jake is gone, but Bill is still there, probably sticking a little closer to his last than of yore, for age and toil for others had worn him down a trifle. Even at that he still had plenty of time to deplore his lack of luck.

On his way home at night he passed, as he had now been passing for several years, a fine shoestore. In golden letters on the show window appeared the name of Jacob Benkler.

As Bill passed by the proprietor came out.

"Howdy, Bill!" he exclaimed; for it was his old friend Jake of the cobbler shop.

"Oh, pretty good, Jake," was the half-weary reply. "You certainly got a fine store. You're in luck all right."

"Think so?" said the shoestore man, and he smiled sort of pityingly as Bill passed on.

Now, Mr. Coal Man, did luck build that gulf between those two men? You know it didn't. The whole truth is there have been too many letters wasted spelling that much-abused word "luck." Just cut out the "l" and "c" and "k" and there you have the answer—"u"; and that's only the short way of spelling the name of the fellow who reads this, whether he is a bricklayer turned contractor or just a plain, ordinary, everyday coal miner drilling and shooting underground.

Go over a list of men who do big things in this workaday world and you will learn they spell luck with the twenty-first letter of the alphabet. Ask for a definition of the word, and they'd all chorus, "Hard work."

Luck does occasionally help a fellow, but the man who depends on it will starve, and in the meanwhile "you" and hard work will be striking the gong "success" a thousand times and will be paving the road to lasting happiness.



Mixin' in with the Upper Ten.

The Point of View

*Written Expressly for COAL AGE
By RUFUS T. STROHM*

Am I a successful man?
Is that the question you're askin' me?
Well now, I reckon it all depends
On what that article ought to be.
If mixin' in with the upper ten
At ball an' luncheon an' gay soiree
Is what you're thinkin' about, why then
I'm only a failure, I'd likely say.

I know a chap who can
write his check
For a million dollars,
an' mebby two,
But if I happen to
meet him—heck!
I don't get even a
howdy-do.
His heart is a chunk
of ice, I guess,
An' a ramrod's stickin' along his spine;
So if his ailment is called Success,
I don't want any success for mine.

He owns a bank, an' he
runs a mill
That roars with hundreds
of whirrin' wheels,
An' folks are kind of im-
pressed, until
They learn he got
'em b y shady
deals;
An' so if lyin', an
graft, an' greed,
An' broken trust are the rotten mess
I've got to use that I might succeed,
I don't want anything like success.

But if a successful man's a guy
Who does his damnedest to earn his pay,
An' has a bit of his cash laid by
To boost him over a rainy day,
Who binds his temper an' curbs his tongue,
Whose life is happy an' free from sham,
Who keeps his mind an' his spirit young—
If that's what you're drivin' at, I AM!

Application of Correct Methods

By E. C. DE WOLFE*

SYNOPSIS—Considerable advantage is realized from the use of a top cutter in a mine where both floor and roof are uneven and top coal must be left. Both wide and narrow work is performed by this machine and the expense of timbering is practically eliminated.

Different ills call for different remedies. Mining conditions at the Clear Creek mine of the Utah Fuel Co. present such difficulties that really satisfactory results have been secured only by adoption of a new method and a new means—the overcutting of the coal with a Goodman Straightface machine.

To show how and why this is done, a statement of physical conditions must be given. The original territory of the mine was limited by a fault beyond which the

top, as the miners' shots brought the coal down in pockets, with hanging masses between. Thus in many places the roof was exposed, while over the remaining area the coal hung in irregular thicknesses. The shocks from the shooting weakened the roof, so that the access of air to exposed spots made the entire top so treacherous as to necessitate the use of timber everywhere.

The success of a Straightface machine in curing these troubles and making large gains in tonnage at reduced costs affords a distinct contrast to the old conditions. Built as a top cutter, the machine enters the coal above the bony band, leaving 6 to 12 in. of coal for a permanent roof and enabling bottom shooting, with only 60 per cent. of the powder formerly used and with no injury to the top. The use of timber is so greatly reduced as to be practically eliminated. From 12 to 15 places per day are cut—three times as many as with the under-



FIG. 1. A ROOM UNDER OLD CONDITIONS

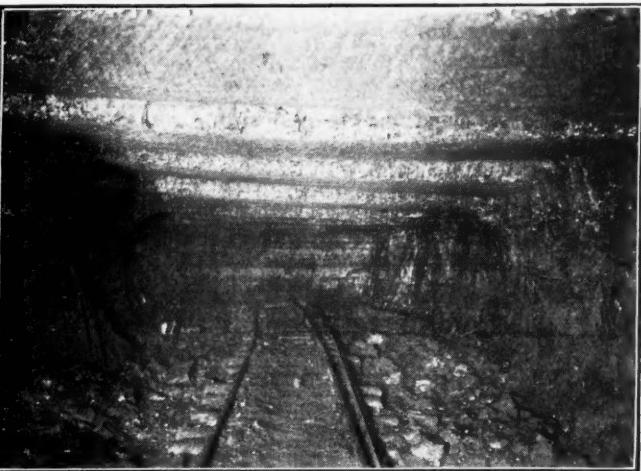


FIG. 2. A ROOM CUT BY THE MACHINE

coal had to be reached by a rock tunnel 1,800 ft. long driven up a 7-per cent. grade. Development of the new territory has proceeded until recently on the same plans and under the same difficulties encountered in the older workings.

The seam is extremely rolling in all directions, making entries and rooms very irregular, with grades up to 11 per cent. The coal is from 7 to 8 ft. thick, with no horizontal cleavage lines. The bottom is hard, but uneven, and from it the coal parts readily. The roof is poor and weak, slacking and falling badly on exposure to the air, while the coal does not separate easily from it. Six feet above the bottom, and therefore from 1 to 2 ft. below the top, there is a bony band $\frac{1}{2}$ to $1\frac{1}{2}$ in. thick.

In the old territory and in early development of the new this coal has been undercut by machines of the shortwall type—the type best suited to undercutting in this mine. The cutting is hard in this tough coal, and four to five places was a good day's work.

The air-slacking roof made necessary the leaving of some top coal to make working even approximately safe. But the nature of the coal and its adherence to the roof made it impossible to leave any fairly even thickness of

cutting machines. These gains loom large in their combined effect—their important savings of powder and timber, the reduced breakage of the coal, the greater production per man and per machine and the generally improved working conditions.

Making its own top, the machine is given necessary clearance in successive cuts by having its cutter bar tilted upward so that when working on the level or a constant grade the inner end of the cut is 3 to 4 in. higher than the outer. This gives a stepped appearance to the roof.

THE BONY PARTING IS A GOOD GUIDE

The bony band in the coal affords a convenient guide to the cutting, enabling the machine runner to maintain the desired thickness of top coal, with small danger of cutting through to the roof, except in spots where quick variations occur in the pitch of the measure.

Rolls in the coal bed are sharp. The machine may make successive runs on a track whose grade has changed several degrees within the length of advance of the machine—7 ft. The rolls occur in all directions, so that the bed may dip or rise straight ahead and at the same time dip to right or left. Like a seagoing craft,

*Chicago, Ill.

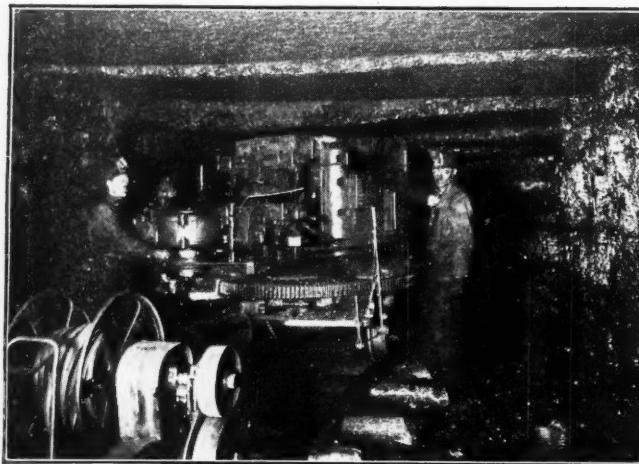


FIG. 3. READY TO MAKE SUMPING CUT

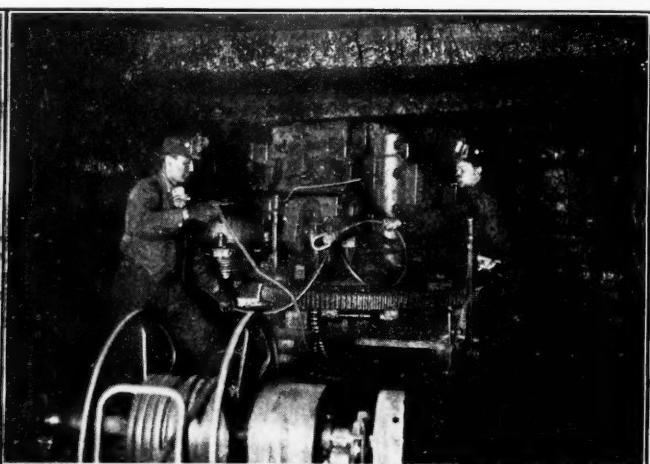


FIG. 4. SUMMING CUT COMPLETED

therefore, the machine has to weather the pitching action of a head sea and the rolling effect of a cross-sea. A topographical map of the seam would represent a surface like one of those choppy seas for which Lake Erie is justly noted.

Since the machine performs its work in position on the track, the rails are so laid that it is "listed to port or starboard" to enable the cutter arm to follow a sidewise dip or rise of the seam from right to left, as indicated plainly by the guiding band of bone in the coal. The rise or dip of the bottom on the last cut is the only guide for the pitch ahead.

The machine cuts a square place, remaining always on the track and operating as a self-contained working unit. It is not a turret machine, but has a more powerful action and a wholly different movement in its swing from side to side. It is sumped at the right-hand side of the room, the machine being drawn straight ahead on the track by a feed rope attached to an anchor set in the face. This makes a straight rib cut.

The feed rope is then disconnected, and the running cut is made as the arm swings to the left, withdrawing until mid-position is reached and then advancing again to the left extreme, under such cam control as to make the arm end follow a straight line across the room.

The arm then cuts its way out as the machine is drawn back along the track by the feed rope attached to a jack set behind. This finishes the cut with a straight

rib on the left, and the machine moves away, leaving a square-cut place.

The machine travels by its own power, at higher speed than is practical with many types of machines. A powerful brake affords complete control, and in this mine, sandboxes are provided to assist in safe handling on the steep grades.

THE MACHINE CUTS BOTH WIDE AND NARROW WORK

The machine does all the cutting in its territory. In rooms it cuts its full width of swing, 20 ft., while in entries it works only 12 ft. wide. An indicator dial shows at all times the cutting distance to right or left of mid-position for the cutter arm, so the runner can gage the width of the cutting closely.

Slabbing is easily done by swinging the arm into the rib to the desired depth and then drawing the machine backward along the track by means of the feed rope, properly attached to a jack or anchor.

Rooms are turned wholly by the machine, in all essentials exactly as in straight-ahead driving of rooms or entries. Frogs and points for the room tracks are laid as the entry driving progresses; and on the stub curves at these room partings the machine makes first what is little more than a slabbing cut, leaving a triangular gash in the rib. The second cut is then started, the cutter arm making the regular summing, swinging and backing cuts of straight work, but with

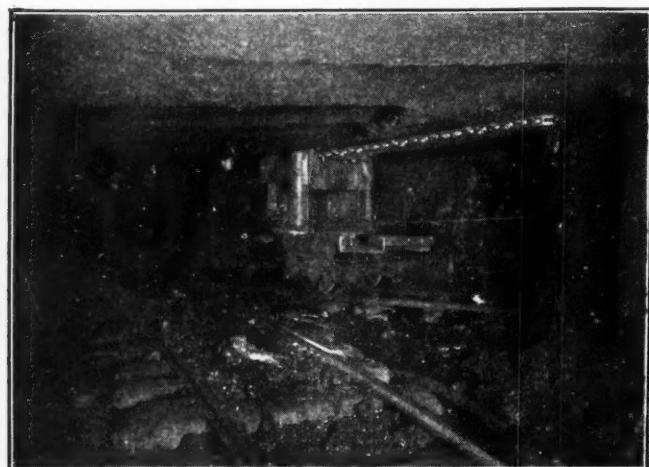


FIG. 5. STARTING SECOND CUT IN A ROOM

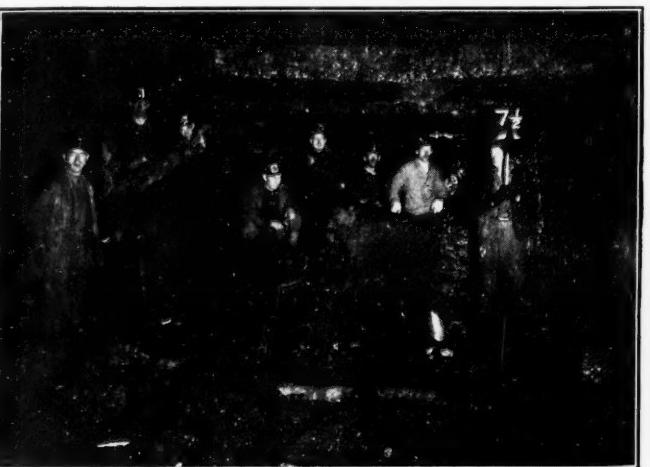


FIG. 6. RESULTS OF A SHOT

the width of the swing so gaged as to give the desired lead for the cut as a whole. Straightened up on the engineer's sights in three or four cuts, according to the radius of curvature for the track, the room is then widened out by giving the cutter arm greater swing.

Breakthroughs are cut as readily, by working to the side on stub partings temporarily laid and moved ahead as the room advances. Thus all cutting is done by the machine.

The one machine thus far in use has to work on both sides of the mine, so its possible production is reduced by time losses in moving and in waiting for chances to pass mules on the main entry. Even with this handicap the machine cuts three times as many places as any of the three shortwall machines in this same territory. On one day, when 15 places were cut, the work was in 10 rooms and 5 entries, making a total of 260 lin.ft. in 8 hr. The time was divided into $4\frac{1}{2}$ hr. cutting, $2\frac{1}{2}$ hr. moving and $1\frac{1}{2}$ hr. waiting. A second machine has been ordered, so that soon there will be one for each side of the mine. Then there is no reason why each machine should not regularly cut 20 places a day.

The top shooting after the undercutting machines required the use of 15 sticks of powder, breaking up the coal badly and leaving an irregular roof, while the bottom shooting after the top-cutting machine requires only 9 sticks, yielding a lumpy coal and in no way straining the machine-made roof of undisturbed coal.

The miners prefer to load after the top-cutting machine, with its greater production of better coal by the use of 40 per cent. less powder, not to mention the safer working conditions under the firm and dependable roof, requiring little timbering. The company secures a larger tonnage of lumpy coal, with a less number of men. Development is more rapid, timber costs are negligible, casualties are reduced, old difficulties are eliminated and in every way the situation is improved by the machine.

■

Extracts from a Superintendent's Diary

Last week I received a letter from the general manager of our company congratulating me and my men upon the fact that according to the company records just compiled, covering the last half of the year, our mine held the record for quality of coal loaded. He then went on to say that for years the management had been having similar figures compiled every six months, but had kept the results solely for the information of the higher officials; this year, however, they had decided to inaugurate a new policy, and in the future results of the tabulations would be forwarded to each of the company's superintendents as soon as completed. He closed his letter by reminding us of the fact that the company's sales, and likewise the number of working days, depended largely upon the quality of the coal loaded for shipment; and looking at the matter in that light, the miners at our camp deserved praise, not only from the company officials, but from the miners at all of the company's mines.

I was so well pleased with the letter that I decided to have it copied and posted on the bulletin boards at once, that all of the miners might see it. Getting our miners to load reasonably clean coal had been no easy matter, but now that our combined efforts had borne fruit, it seemed only fitting that all who were in any way

responsible for the feat should share in the glory. To give the matter a personal touch I added a short footnote calling attention to the fact that our company had earned quite a reputation during the year because of the average quality of coal that it shipped, and as a direct result was now so well supplied with orders that our neighbors were becoming jealous and puzzled.

I did not have to wait long to get an expression upon the manager's letter and my comments thereon; the general manager forwarded me a letter today that he had received from one of our pit committee, inspired entirely by the correspondence posted on the bulletin boards. The burden of the letter was a vigorous protest against the assumption of the manager that our miners deserved praise because they had loaded clean coal. According to its writer, they had no desire to load clean coal, and the only reason they did load clean coal was fear of the outrageous dockage that inevitably resulted when a poor fellow was unlucky enough to have his check found on a car containing slate and bone in excess of certain arbitrary limits (arbitrary was underscored).

It was a very long letter and was apparently written while its writer was in an angry mood. It was full of repetitions, and with each repetition it became more and more evident that he held his temper with difficulty. To accuse a miner of having such motives—surely some managers had the nerve of the devil! Fortunately the miners still had some committeemen who would not stand for such slander and were willing to tell managers just where to get off. Much of this was only intimated, but it was there nevertheless.

After reading the committeeman's letter, I found myself moved by two conflicting emotions—the humor of it and the pathos of it. What humorist could conceive of anything more ridiculous, and yet back of it all, what tragedy? One of my inside foremen has a pet expression that he uses on all occasions: "Well, isn't that just like a miner!" He has used it so much that it doesn't mean much to him, but as it flashed through my mind tonight, I realized how expressive it really is.

■

A Successful Hoist Installation

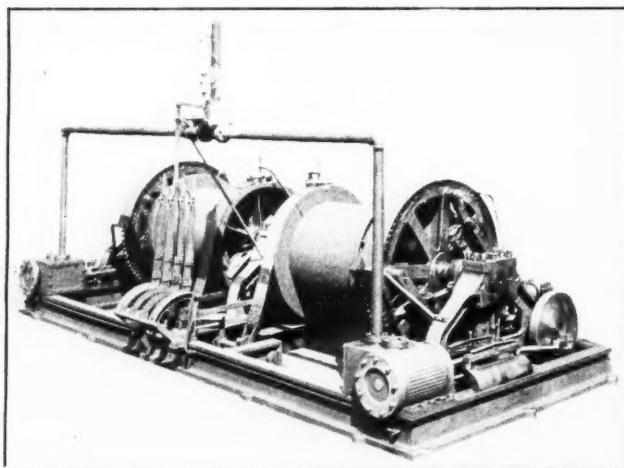
The installation of a mine hoist which has proved eminently successful in operation was recently made by the Maple Ridge Coal Co., at Holsopple, Penn. This company opened a new slope (which will eventually be 3,000 ft. long) and asked for bids on a hoist to handle the output. After receiving a number of proposals from mine hoist manufacturers, Cornelius Meagher, superintendent of the mine, was sent to investigate the merits and details of construction of the various hoists.

Mr. Meagher, after visiting several plants and looking into the general styles of construction, also went to various mines to see different types of hoists in operation. It was his recommendation that the S. Flory Manufacturing Co., of Bangor, Penn., which has been building hoists for more than 30 years, be awarded the contract. This was done and the hoist supplied.

This hoist was chosen because of its simple construction, ease of operation and the rigidity of the band friction. The machine furnished was of the double cylinder type, $12\frac{1}{4} \times 15$ in., with drums 42 in. in diameter and 42 in. long placed side by side. These drums were equipped with the hand-operated Werner patent band friction.

The hoist was designed to handle 120,000 lb. on a 6-per cent. grade at an average rope speed of 500 ft. per min. Provision was made, however, for considerable surplus power and overload capacity. In writing to the manufacturers some time after the hoist was installed Mr. Meagher said: "We pull out 20 loaded cars, each weighing 4,500 lb. gross, and drop back empty cars also in trips of 20, and all of them standing on a 9-per cent. grade against the load. The empty cars have their wheels locked. We can start a trip of loads without trouble. The largest trip we have yet hauled was 23 cars, and when these got outside I discovered that 8 of them were off the track. The slope has an inclination of 14 per cent. against the load, and as far as I could see the hoist was not overloaded."

According to Mr. Meagher's statement, the hoist has hauled loads of almost 100 per cent. above its rated capacity. The machine is equipped with cut steel gears,



THE HOIST AT HOLSOOPPLE, PENN.

wood-lined brakes and flanges on the drum deep enough to store 6,500 ft. of $\frac{3}{4}$ -in. rope. The band frictions are hand-operated, being controlled from the battery with but slight exertion on the part of the operator. The hoist may, however, be equipped at any time with steam-operated thrusts.

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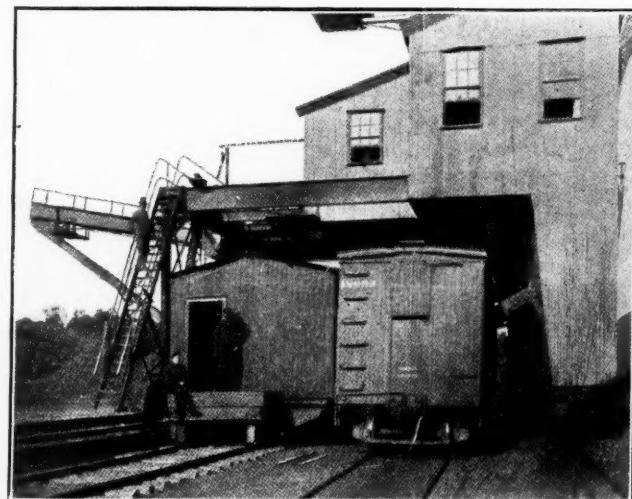
A New Portable Loader

By J. TRACY HALE

"A powerful portable loader that runs on a standard-gage track," is the way the Manierre Engineering and Machinery Co. characterizes its latest success in the coal-loading field.

This loader, which loads coal without any appreciable breakage, operates under the usual conditions, but has two features that the ordinary portable loader does not boast; that is, it operates on a standard-gage track and it "spots" cars without the use of the dangerous cable and snatch block.

Portable loaders have always been operated on an extra-wide gage, because they upset when extended on a standard gage. The new Manierre not only operates on standard gage, but will also load a boxcar on parallel tracks spaced the legal 13 ft. center to center. The importance of this will be fully appreciated by any concern in the coal-loading field.



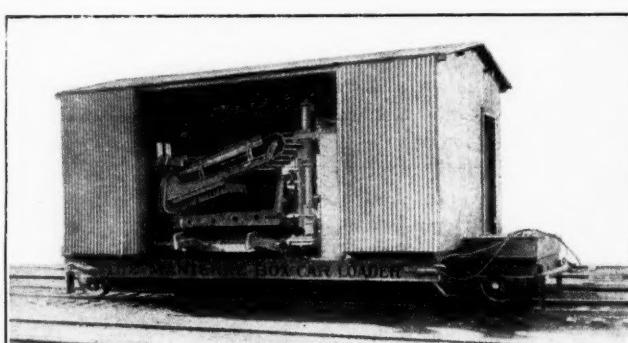
READY TO LOAD BOXCAR ON STANDARD-GAGE TRACK

The second feature of this new machine is the manner in which it is coupled to the boxcar when "spotting." As stated, the dangerous and slow cable and snatch block are discarded. Two hinged arms engage the door-frames of the boxcar to be loaded, and it is at once firmly held in the exact position for loading. This method, it will be seen, makes for speed, because the wheels do not have to be blocked, and the loader can be run into the car while in motion and the chute can be attached the instant the car is in position.

The control of the car which carries the loader itself is very much like that of a street car. It does not take a skilled mechanic to handle it. The loader will pull six loaded cars, and as a result of the ability of the machine to handle all the coal that can be got to it and its speed in "spotting," the loader has a capacity of 300 tons hourly.

The loader proper, which is of the usual standard 24-in. steel-apron type, has one new feature of exceptional interest and value. When going in and out of a car or when swung out at full length on its supporting arm, it is kept in perfect balance by means of a drum controller which the operator starts right or left as indicated by two pilot lights on the loader proper. Those familiar with such loaders will fully appreciate the added advantage of this device, as the operator has the balance of the loader under control at all times. He thus can facilitate its movements into and out of a boxcar.

Seven months of work on the docks of the C. Reiss Coal Co., at Manitowoc, Wis., have proved the efficiency and reliability of this portable boxcar loader.



SELF-PROPELLED LOADER AT MANITOWOC, WIS.

Successful Reduction in Coal Breakage at Tipples

BY MINER RAYMOND*

SYNOPSIS—Though we always talk of "dumping" coal, in no modern tipple is coal dumped, but slidden and gently at that. The coal finds its way from the mine to the gondola by a series of gliding and transporting movements—a quite different experience from that from which it suffered a few years back.

So much has been said and printed on the subjects of efficiency and its partner scientific management and so many crimes have been committed in their names that the mere mention of either is liable to draw a heavy sigh of extreme ennui from the reader. Someone has defined efficiency as the successful stoppage of all economic leaks in any given commercial activity, and this article will deal with the successful plugging of a hole through which profits have been slipping away from the coal operator. The leak in question is the troublesome breakage experienced in the preparation and shipment of bituminous lump and egg from the mine dump to the dealer. As the remarks following apply equally to both

lump and egg, for purposes of brevity lump only will be considered.

Although there is no fixed rule, as a matter of common understanding, dealers are expected to accept without complaint a car of lump in which the breakage loss does not exceed 5 to 7 per cent., according to the softness of the coal. This applies to hauls of 500 miles or less with one or two transfers of the car from train to train. Inquiry among dealers in northern Ohio has developed the fact that this expected 5 or 7 per cent. has been reduced to 2 or 3 per cent. by coal operators who have modernized their plants by the installation of efficient screening and loading equipment. A breakage 50 per cent. below that which the dealer is expected to accept is a certain indication of successful preparation.

MODERN TIPPLES NEITHER JAR NOR DROP COAL

As it would take nothing less than a cataclysmic reorganization of the character of train crews in general to cut down the breakage caused by the jerks and bumps in transit, we must look to the tipple for the cause of the improvement noted in the foregoing paragraph. Let us trace the course of a lump from the time it leaves the cage or mine car until it comes to rest in the railroad

*Tiffin, Ohio.



FIG. 1. UNDER SIDE OF LOADING BOOM AND CONE OF COAL IN END OF CAR



FIG. 2. END VIEW OF HALF LOADED CAR. NOTE BOOM COUNTERWEIGHT

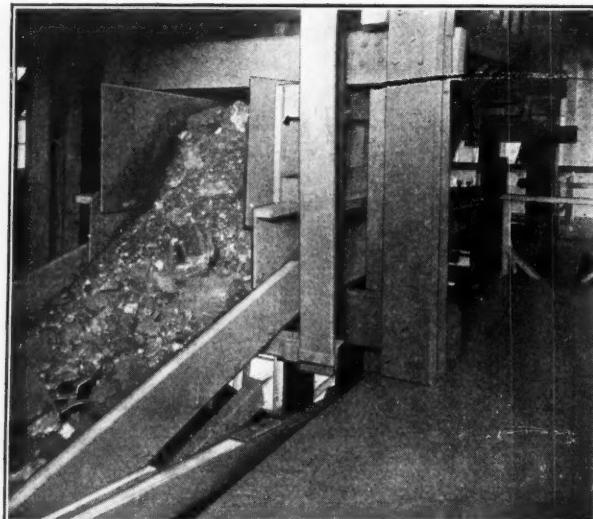


FIG. 3. PLATE FEEDER DELIVERING TO SHAKERS

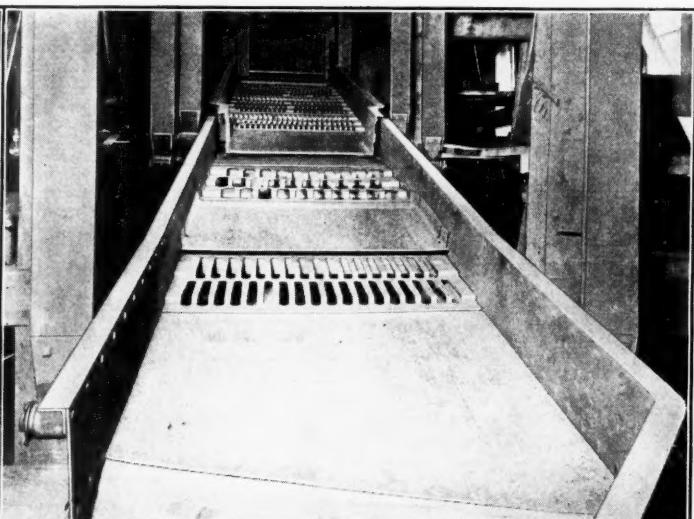


FIG. 4. FRONT VIEW OF THE SHAKER SCREENS

car, ready to start on its travels. For our illustration we will use an imaginary tipple differing in no point of design or equipment from the ordinary run of up-to-date tipples now being installed. The cuts in connection with this article are photographs of equipment designed and manufactured by the Webster Manufacturing Co., Tiffin, Ohio, for various tipples in the West Virginia and Virginia fields.

The product of the mine is brought to the tipple dump by mine car or cage according to whether the tipple is at the shaft opening or some distance away. Much attention has been given to methods of discharging cars, but with the development of the rotary type of dump, with its carefully designed collecting chute, breakage at this point has been greatly reduced from that experienced under older methods. With a modern rotary dump the coal slides rather than falls into the dump hopper, and the presence of slack acts also as a cushion for the lumps, softening the jars and shocks.

A FEEDER IS EMPLOYED

From the hopper the coal is delivered to the first screen by a feeder, usually of the reciprocating plate or apron conveyor type. With neither of these feeders is there any loss due to breakage, as both convey the coal to the screen in a constant stream, and the fall at the discharge point is small. The cushion of slack is

still present to soften any possible jar or shock to the coal. During the screening process, providing the screens are properly designed to prevent any lodgment of lumps in the perforations, no fall is encountered that will seriously break even the softest coal. Over the screens themselves the lump is subjected to nothing but a slide, urged on by the oscillation of the shakers. Where more than one separation is made and the lumps pass over more than one screen, clearance between two successive shakers is from $1\frac{1}{2}$ to 3 in. As the lump is carried over this slight drop at some speed, the momentum gained makes its path more of a glide than a fall and no damage is done. The same is true of the point where the lumps pass from the lump screen to the picking table. Here again the clearance is not greater than 3 in. and no jar is experienced, particularly as the lump and conveyor are traveling in the same direction and at nearly the same speed when they come into contact.

We have now arrived at another point where breakage has been very troublesome. So far the lumps have been screened and picked with safety, and the problem of avoiding breakage centers itself in transferring the lumps from the picking table to the car. In the older tipples where curved or sliding chutes are still used, a destructive fall is unavoidable, especially in forming the first "cone" in the end of a car. Fortunately for all concerned, this difficulty need no longer worry the progressive operator, as the solution is found in the modern loading boom, of which views are here shown.

It is interesting to note that the boom is an outgrowth not only of the various attempts to load lump successfully, but of a development in methods of refuse removal. About 20 years ago a steel apron conveyor, very similar to the one now widely used, was first operated as a picking table, but refuse was removed from the run-of-mine before screening took place. In the next few years designers of tipples placed this steel-apron picking table immediately below and at right angles to the end of the lower screen, discarding the spiral chute, but retaining the extensible type for loading cars. This step advanced picking methods, but did not help the breakage at the loading point.

The next improvement brought out the modern boom, which is merely an extension of the picking table, the



FIG. 5. A CAR ALMOST LOADED WITH LUMP COAL

framework being hinged at a convenient point. The outer end is hung from wire cables and can be raised and lowered at will. The boom is counterweighted, permitting the use of a small and compact hoist usually placed at the upper end of the conveyor, but controlled from the trimming platform by cords which terminate in heavy handles.

As to the avoidance of breakage by the use of this equipment, the illustrations speak for themselves.

At the United Collieries, Inc., of St. Charles, Va., a loading boom was introduced which, according to C. W. Bondurant, has put an end to the breakage of block coal resulting from the former use of an ordinary chute. The longest drop the coal sustains is when the first blocks fall into the car. They only drop about 16 in., and as soon as a cone is formed the rest of the loading takes place without further breakage. The boom also supplies 8 ft. of picking space, so that the coal is not only free from small pieces, but also cleaner from slate than it would otherwise be.

2

Success in Mechanical Detail

The progress and the success of the present generation rest not so much in its larger inventions as in its perfection of detail. The Boulton and Watt engines were delayed in their progress toward success by the fact that boilers of sufficient strength and reliability had not been up to that time constructed. So the engines had at first to operate on low pressure. The automobile and the flying machine have similarly been hindered by the inability of the manufacturers to supply engines of the requisite power per pound of dead load.

It is the man who makes a specialty of a detail who makes possible much of our vaunted progress, for after all the inventor merely assembles such parts, and if they have not been developed he cannot invent to any purpose. Many of the present wonders of invention may have occurred to dreamers years ago, but they did not have

the wherewithal to put them in practice, and the ideas were stillborn.

The success of the modern mining plant similarly depends on those parts which permit of steady work and certainty, and one cannot afford to overlook such details. Efficiency in an economical plant is often impossible because a few parts have a way of breaking down and making trouble. Only continuously smooth running can give a good yearly average. For example, the Jefferson Union Co., of Lexington, Mass., has specialized on one small part, has successfully arranged to make it sufficiently heavy and well designed that it may be always equal to its work, has simplified its construction, reduced corrosion to low limits and has so constructed it that it can be connected and disconnected rapidly.

The union is made of high-grade air-refined malleable iron, carefully inspected and properly tested. The brass seat ring is set into a recess in the union so that it cannot work loose under the unequal expansion of the brass and iron. The spherical face of the upper part of the union is ground in contact with the seat with which it must be paired in use, and the parts are kept together so that each part will be assembled only with its mate.

An infinitesimal leak once started, releasing steam from its captivity at say 100 lb. pressure per square inch, will rapidly enlarge a passage in the seat until a large and annoying leak will result. The weak points in a union become progressively weaker, and nothing is more important than initial perfection in workmanship.

A union is like anything else—give it your whole attention, organize to make nothing else, think of it, dream of it, excluding all distracting interests, and an article of merit is bound to be the result. Fourteen years of such coördination of effort and resource on one such small article is certain to result in the manufacture of a leading product. We talk glibly of specialists, but there is no one who has a title to the designation equal to that of the careful and painstaking manufacturer.

Written Expressly for Coal Age

SUCCESS

BY BERTON BRALEY

Oh, it isn't in the dollars and it isn't in the fame
And it isn't in the prices of the coal,
And it isn't in the winning, but in how you play the game,
And in how you've kept your conscience and your soul;
There is merit in the dollars that you honestly acquire
Out of all the lively struggle and the stress,
But the prize of true endeavor is a finer thing and higher,
If your fellow mortals like you—that's Success.

You've a right to win a profit from your muscles and your brain
And the wealth that you've created you have earned,
For the world, in simple justice, will not grudge your honest gain,
And the money's not intended to be spurned;
You should get what you have coming, miner, timberman or boss.
There's no reason you should garner more—or less,
But remember, when you figure on the profit or the loss,
If your fellow mortals like you—that's Success.



It is good to get the money, but if that is *all* you get
And your trail is one of ruthlessness and hate,
You're a poor benighted failure, doomed to sorrow and regret,
Though you live in regal splendor and in state;
This is *not* a world of money or machinery, but *men*
(Though we oftentimes forget it, more or less),
And for owner or for trapper here's the simple truth again,
If your fellow mortals like you—that's SUCCESS.



The Rands Shaking Loader

SYNOPSIS—Friable coals after even the most careful preparation are often more or less injured in the process of loading into railroad cars. A shaking chute with an adjustable shake deposits the material gently and with minimum degradation.

In preparing coal for domestic use much thought has been given to provide a method that will clean and size the larger grades perfectly. After this has been accomplished, however, too often the product is broken up and its commercial value decreased in the process of placing it in cars for shipment.

As a means of preventing this degradation the most modern tipples have been equipped with booms that are designed to deposit the coal gently and trim the load to a good appearance. Some of the best free-burning coals are very friable and even after the most careful sizing contain a small percentage of fines.

Such coals are found in Somerset County, Pennsylvania. It was to meet the need of a boom that would rescreen sized coal and then load it gently in a car that the Rands shaking loader was designed. The loaders that are the subject of this description were built for the Brothers Valley Coal Co., at Macdonaldton, Penn. They are at the No. 3 mine, the first installation of these load-

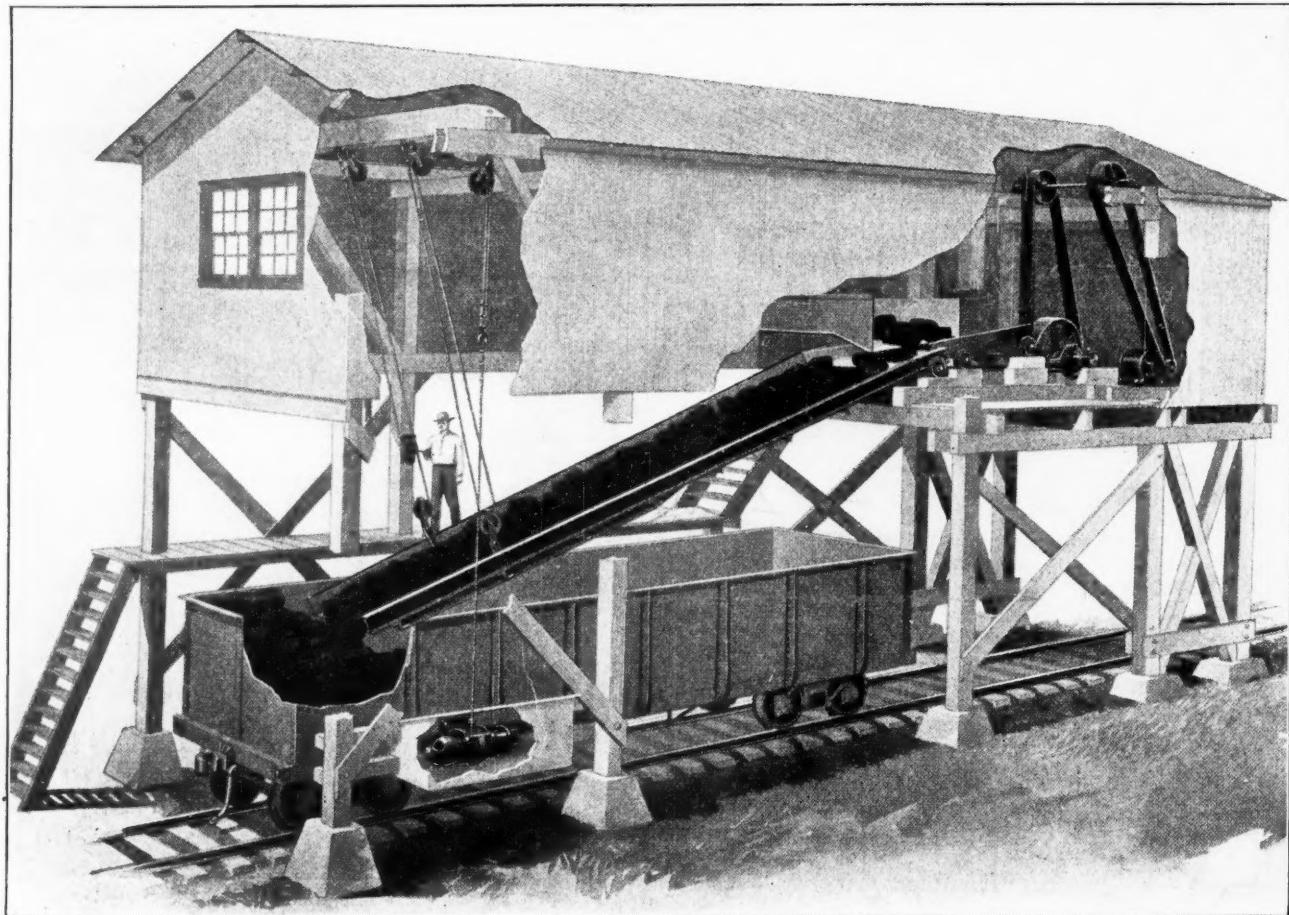
ers having been made at the No. 2 mine of the same company.

In most tipple installations two booms are employed, one being for lump and the other for egg coal. The booms are installed in connection with a Marcus screen, so they are on the same level and practically duplicates. An accompanying illustration shows the ideal installation and operation of a loading boom.

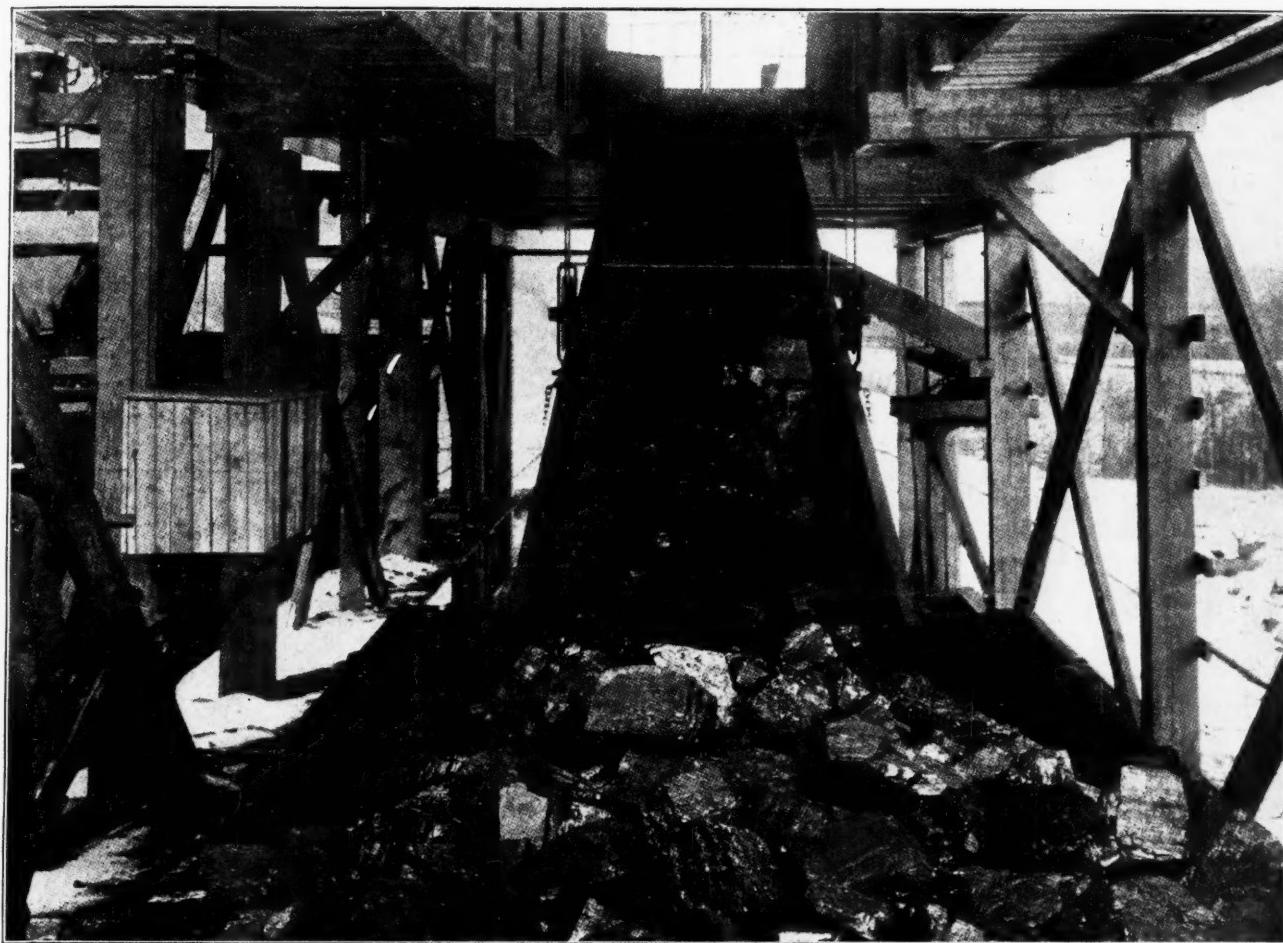
The delivery from the end of the screen to the booms is made so as to give practically no drop. Each boom consists of two reciprocating chutes, the upper one having a small but fixed slope, while the lower portion has its upper end pivoted so that the lower end can be raised or lowered by means of an electric hoist. This lower chute in its lowest position delivers the coal near the bottom of the car.

This maximum inclination is never enough so that the material will flow by gravity, and the minimum is never so little that any kind of coal cannot be shaken down the chute.

The upper chute with the fixed inclination is driven with an eccentric with a fixed stroke. The lower chute is driven by an eccentric set at 180 deg. to the first and through a link, so that by moving a block up or down the rod attached to the block imparts a long or a short stroke to the chute. This adjustment is simple, yet one which it is highly desirable to have.



POSITION OF RANDS LOADER WHEN COMMENCING TO FILL A RAILROAD CAR AT THE TIPPLE



THE RAND BOOM SHAKING LUMP COAL INTO A CAR

The movement of the block is controlled by a pair of levers pivoted to a crank arm on a shaft; the movement of the shaft is in turn affected by a worm and wormwheel at the end. The wormwheel is at the upper end of the shaft. On the other end is a handwheel which controls the stroke adjustment.

In starting to load a car the lower boom chute is first dropped to its lowest position by the boom hoist, then the operator by means of the handwheel adjustment lowers the connecting-rod to its lowest position and shortest stroke. When the chute is steepest a slight movement conveys the coal.

RAISING AND LOWERING THE BOOM

As the coal pile builds up, the end of the chute is raised, but it is always kept close to the coal. The operator by a few turns of the handwheel can lengthen the stroke as the end of the boom rises. This operation needs only to be repeated a couple of times until the boom is loading in its highest position. The provision for rescreening consists of 3 ft. of perforated plate at the extreme upper end of the lower boom. The dust from this screen drops into a small screw conveyor and is carried to the slack track.

This somewhat detailed description is given to show the successive steps necessary to handle friable coal. It has been demonstrated that for such a material this process is necessary and has produced profitable results through the decrease in degradation and consequent less amount of fine material in the car and the better appearance of the load.

It is not necessary to provide booms with an adjustable stroke for all kinds of coal, so this refinement can often be dispensed with. The booms described were designed and built by the Roberts & Schaefer Co., and the patents therefor are owned by it.

☒

Helpful Axioms

When you have no reason to smile, keep in practice anyway.—"New England Pilot."

☒

Live each day so as to shake hands with yourself every night.—"New England Pilot."

☒

A man without enthusiasm couldn't sell steel saws in a jail.—"New England Pilot."

☒

The world bestows its big prizes both in money and honors, for but one thing—and that is initiative.—Elbert Hubbard.

☒

To travel hopefully is a better thing than to arrive, and the true success is to labor.—Robert Louis Stevenson.

☒

It takes an unusually smart man to speak seven languages, but it takes a smarter man to remain silent in one.—"New England Pilot."

☒

It may be proved with much certainty that God intends no man to live in this world without working; but it seems no less evident that He intends every man to be happy in his work. It was written, "in the sweat of thy brow," but it was never written, "in the breaking of thy heart."—Ruskin.

Chance Acetylene Safety Lamp

By H. M. CHANCE*

SYNOPSIS—Description of an improved acetylene safety lamp recently developed by T. M. Chance. It retains the brilliant light and testing power of former acetylene lamps, but successfully adds to them safety and the power of automatic relighting whenever the lamp is extinguished.

The acetylene lamp is readily extinguished by a concussion. As the generation of gas is continuous, reignition if only provided by an uncertain hand-operated device might be delayed till a violent explosive mixture was formed in the lamp. The gauze might pass the flame of the resultant explosion, and thus a gaseous atmosphere surrounding it might be ignited. It was only the successful provision for instant relighting which made it possible to retain all the great advantages of an acetylene safety lamp without the introduction of any of its dangers.

All flame safety lamps employ a wire gauze, perforated metal or other equivalent means for preventing the passage of flame from the combustible gases inside the lamp to an inflammable or explosive atmosphere surrounding it.

In recent years the principal object sought has been the development of a safety lamp that will give more light than those in common use. The best results so far attained, in lamps that have come into general notice and use, have been obtained from oil- or benzene-burning lamps of the bonneted Mueseler and Marsaut types, which have a glass shield surmounted by a gauze that is surrounded by a protective metal bonnet.

The illumination obtained from such lamps has ranged from 0.6 to 1.2 cp. for lamps of the Marsaut bottom air-feed type and from 0.5 to 1.3 cp. for lamps of the Mueseler nonreflector type, down to from 0.15 to 0.2 cp. for standard Davy lamps. The electric miners' cap or hand portable lamps in use give about 0.50 mean horizontal candlepower.

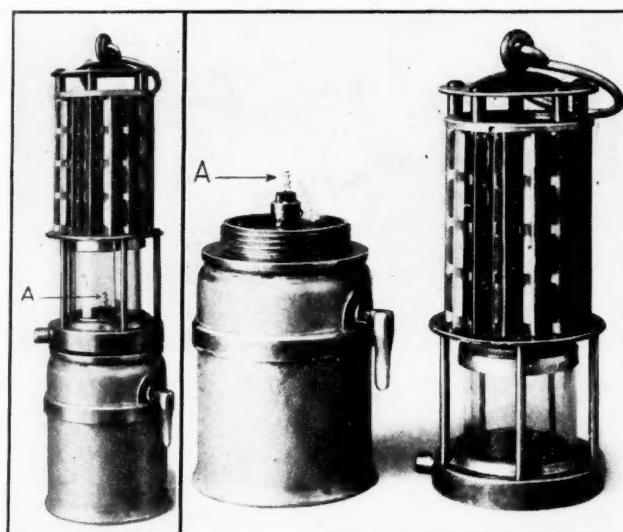
DANGER AND DIFFICULTY OF WORK IN THE DARK

No one who has not actually used these several types in the working places of coal mines can possibly appreciate how poorly such small candlepower illuminates the working places and how far these lamps are from giving enough light for really efficient work. Most of them in practice do not continuously give even the small candlepower at which they are nominally rated, but even when working in their best condition they give poor illumination of the fallen coal or of the working face. As the black surfaces of the coal, of the floor and of the roof reflect little or no light, the miner in doing his work must depend largely upon other senses than that of sight to fix the relative location and position of the coal or of the coal faces upon which he is working.

He cannot see to drill or to use his pick or shovel effectively, nor can he readily or easily see the slate or other refuse that should be removed from the coal. When he examines the roof he may at times overlook dangerous

conditions and at other times set props where none are needed. In other words, handicapped by insufficient light he mines and loads less coal, is more likely to be injured by falls of roof, etc., is more apt to suffer impairment of vision from eye strain and is more liable to send out dirty coal than his fellow who is working with an open oil torch or an open acetylene lamp.

It will perhaps be unnecessary to refer to the great improvement in mine lighting that has in recent years been effected by stationary electric lights and by the use of portable acetylene lamps. In many mines the open acetylene lamp has almost entirely displaced the open oil torch and has furnished the miner with light at a cost equal to or materially less, light for light, than that of an oil torch. The relation of these costs depends of



FIGS. 1 AND 2. WOLF LAMP WITH CHANCE BURNER

course upon what grade of oil the miner may be permitted to use in open torches. Where high-grade oil is required, the cost of the acetylene light is much less than that of the open oil lamp. If in comparing the relative costs of these two methods of lighting we take into account the illuminating candlepower furnished by oil and by acetylene, we find that under practically all conditions the light produced from acetylene is much cheaper than that obtained by the use of oil.

Many attempts have been made to use acetylene in safety lamps, and a number of acetylene safety lamps of different types have been manufactured and offered for sale, but none of them has come into general use. The obstacle to the use of such lamps is that they fail to meet requirements which are essential to safety.

PRESSURE OF CONCUSSION DRIVES BACK GAS

It is well known that an acetylene lamp or any lamp burning a combustible gas which is supplied to the burner under a very low pressure—a few inches of water gage, or an ounce or two pressure per square inch—is easily extinguished by a shock or concussion such as that produced by blasting. Whenever the atmospheric pressure

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external to the lamp becomes greater than the pressure of the acetylene or other combustible gas, the flow of acetylene through the burner tip immediately ceases and the flame is extinguished. If this rise in pressure is caused by a pressure wave from the concussion of a shot in blasting, the flame is instantly extinguished, but the jet of acetylene is immediately re-established, for such pressure waves travel at high velocity and the duration of this increase in pressure at any place is but a small fraction of a second.

When an open light is thus extinguished the miner can use a match or a reigniter to relight his lamp, but if his light is a safety lamp, it is of course locked so that he cannot open it, and his only remedy is to find the lamp, feel his way out and return the lamp to some lighting station underground or at the surface, where a lamp tender is on duty to perform this service.

The only way of avoiding this annoyance and danger to the miner is to equip the lamp with some form of relighter by which he can himself relight his lamp, and this has been done in some types by the use of a strip of paper with phosphorus patches, similar to many pocket cigar lighters or by the use of an "Auer-metal" relighter. As neither of these is automatic, and as some seconds or minutes may elapse after the lamp is extinguished before the miner finds it or attempts to operate the relighter, the acetylene that has passed through the burner while the lamp was extinguished has had time to form an explosive mixture filling the interior of the lamp. Under such conditions the miner in operating the relighter will of course fire this combustible mixture and produce an explosion that may wreck the lamp or may force flame through the lamp gauze and ignite any explosive or combustible atmosphere surrounding it.

SELF-IGNITER RELIGHTS LAMP INSTANTANEOUSLY

To overcome this difficulty it is evident that the relighter must operate to relight the gas-jet immediately after it has been extinguished; that is, the acetylene gas-jet must be reignited just as soon as acetylene again commences to flow through the burner. To meet this condition the relighting device must therefore work automatically and instantaneously.

In the acetylene safety lamp described this end has been attained by placing a refractory substance, capable of absorbing and retaining heat, adjacent to the flame of the lamp, but not in contact with it, and of such dimensions and shape as will insure the heating of this substance, mainly by heat radiated from the flame, to a temperature higher than the temperature necessary to ignite acetylene.

The reigniter shown by the photograph is a flattened, serpentine coil of "Nichrome" wire, an alloy of nickel and chromium. It is placed between the flames of the burner, which may be furnished with two or any desired number of jets.

The action of this reigniter is positive and certain. The lamp has been subjected to test by placing it within 30 ft. of holes for raising bottom, heavily charged with dynamite. These shots extinguished all other lamps at much greater distances. It readily put out the acetylene lamp also, but it was instantaneously reignited, and the spectators, not realizing that it had really been extinguished, expressed themselves as of the opinion that no relighting device was needed for a lamp which could

remain burning in face of such an explosion. This reigniter remains red-hot as long as the lamp burns; that is, as long as the carbide charge is generating acetylene, and will always instantaneously reignite the flame when it is extinguished by shock, jar or concussion.

In constructing these lamps it is important to so locate the reigniter that it will not be in contact with the flame, because the latter will be chilled by the contact and its temperature will be lowered, its luminosity reduced and a deposit of carbon will form upon the reigniter which will quickly grow to a mass of considerable size. Any such accretion will still further reduce the temperature and luminosity of the flame. Carbon so deposited upon the reigniter will become detached and may clog up the burners or become deposited on the glass shield or upon the wire gauze.

SPECIFICATIONS FOR A PRACTICAL REIGNITER

In developing this lamp many different forms of reigniters have been tried out in practice, including different metals and refractory nonmetallic materials, fabricated in many different shapes and forms and of widely varying dimensions. As a result of this work



FIG. 3. A 12-HR. COMPACT LAMP OF LIGHT WEIGHT

certain conditions have been clearly established as necessary to success. The most important of these as already stated is that the reigniter must not be in contact with the flame. Another essential requirement is that the reigniter must be operative whether the flame of the lamp be high or low. It is of course essential that it be rugged enough to withstand ordinary shocks and jars, and it must not quickly deteriorate or become weak or brittle from oxidation or any other cause.

In practice the lamp will be cleaned, charged with carbide and water, lighted, assembled and locked in the lamp house by the lampman, and handed to the miner lighted and ready for use and capable of burning at its rated capacity for a full shift of say 9 or 10 hr. It

will be practically impossible to extinguish the lamp by ordinary shocks, jarring, swinging at high angles from the vertical, by the concussions caused by shotfiring or by drafts in going through doors or while traveling along airways or roadways.

It can be turned down for gas testing, and for this purpose is more sensitive than a Davy or other oil lamp, and it can be extinguished by turning off the water and gas should the miner at any time find it necessary to extinguish it because of the presence of firedamp in dangerous quantity. When so extinguished it will of course be necessary to return it to the lamp tender, either at the surface or at relighting stations maintained underground for this purpose.

The lamps shown by the photographs are of the two-jet burner type and will give from 3.0 to 4.5 standard English sperm candlepower. Some flame safety lamps are said to produce 1.75 cp. using kerosene, but this illumination is obtained by means of a reflector. It will be readily understood that if resort be had to the use of a reflecting device a concentrated light of 6 or 7 cp. can be obtained from this acetylene lamp.

EFFICIENCY WHEN THE LAMP GLASS IS SMOKED

It should be noted that the candlepower is greatly affected by the condition of the glass. Oil-lamp glasses soon get sooted and greasy, and the effective light is thus greatly reduced. If the factor of absorption of light by a glass shield be taken at 0.5 cp.—that is, the light lost by the dirty condition of the glass—a benzine lamp of 1.0 cp. is reduced to 1.0 — 0.5 cp., or 0.5 cp. in actual service, and the loss of this quantity of light has been ascertained in many lamps in underground use.

If the same high loss is experienced in the acetylene safety lamp—a quite unlikely condition, as this type of lamp does not often make much soot—then the effective light from a 3-cp. acetylene lamp will be 3.0 — 0.5 cp., or 2.5 cp., and the ratio of the benzine to the acetylene lamp illumination is as 0.5 is to 2.5 or as 1 is to 5, instead of the ratio of 1 is to 3 with the glasses clean. The lower percentage of light lost from dirty glasses will thus be an important factor in comparing the relative illumination obtained with oil and acetylene lamps.

It is common to find the gauze of the oil-burning safety lamp badly sooted, and hence unsafe, after a few hours' burning. The acetylene safety lamp can often be used for days without the gauzes needing to be cleaned and with a relatively small accumulation of dirt on the inside of the glass.

The oil-burning safety lamp is extinguished in atmospheres containing 16 to 18 per cent. oxygen, while the acetylene lamp can burn in air containing as little as 14 per cent., and men can exist in an atmosphere containing less than 12 per cent., and in some cases if there is only 10 per cent. of free oxygen. Hence the acetylene safety lamp may be used in atmospheres extinctive to oil lamps and will also detect firedamp in atmospheres that are so low in oxygen, due to the presence of this inflammable gas, that they will actually extinguish the oil-burning safety lamp.

The advantages which may be claimed for this type of lamp may be briefly and conservatively stated as follows:

1. Illumination—The superior illumination which is given by this type of lamp, being from three to six times

that of any oil or electric safety lamp now in use, will (a) enable the miner to make a better inspection of the roof, props, etc., and keep his working place safer and in better condition for economic and efficient work; (b) aid him to clean the coal from the slate in a much better manner than is now possible, thus saving a large economic loss now suffered in many safety-lamp mines; (c) enable him to increase his output, owing to increased efficiency in mining and loading the coal; (d) improve his working conditions by reducing the eye strain resulting from the deficient illumination supplied by the oil and electric safety lamps now used.

2. Relighting Properties—The reignition is absolutely automatic and instantaneous in action. It cannot cause interior explosion in the lamp. Some of the advantages that will follow its use are: (a) In case of a colliery disaster, such as an explosion of dust or gas, the lamp will instantly relight itself. Hence the miner is not left in darkness, as is the case when kerosene or sperm oil safety lamps are used. The miner will thus have a much better chance to make his escape before the after-damp reaches him. (b) Reignition is provided without the accompanying danger of wrecking the lamp by internal explosions and the risk of the firing of an explosive atmosphere, as is the experience when using manually operated reigniters with benzine safety lamps. (c) Increase in atmospheric pressure due to blasting or falls of roof has no effect on the efficiency of the lamp, the reigniter automatically relighting the lamp after any such disturbance may have extinguished it. (d) The acetylene lamp cannot be extinguished by jarring or overturning, as is the case with oil-burning lamps, and if laid on its side the flame burns centrally in the lamp gauze with little danger of overheating and breaking the glass, an accident quite likely to occur in oil-burning safety lamps.

The lamp shown in the photograph, Fig. 1, is a German Wolf acetylene safety lamp of 12-hr. burning capacity which has been converted to operate under the system described by the addition of the automatic reigniter, marked *a* in the figure. Fig. 2 shows the same lamp as it appears partly disassembled. The lamp shown in Fig. 3 is a proposed 12-hr. lamp with standard Wolf bonnet, but with a type of acetylene generator designed to produce a lighter and more compact lamp.

x

Pennsylvania Retailers Are To Be Investigated

The Governor of Pennsylvania has appointed C. Tyson Kratz, of Norristown, Penn., as the third member of the commission to investigate the cost of retail coal. Mr. Kratz succeeds Thomas Martindale, the Philadelphia merchant, who declined the office. The commission is to ascertain if the retail price of coal has been increased owing to the imposition of the first coal tax law on July 1, 1913. The commissioners are without salary, but are allotted \$5,000 for expenses. Mr. Kratz is an attorney with independent means, and on account of a very picturesque manner he has in performing his duty, the proceedings will be quite enlivened. The retail dealers are enthusiastic over the proceedings, as they want the coal-consuming public to actually see under the authority of law just what a small proportion of the cost of coal accrues to them.

Ventilation Without Crosscuts

BY W. J. MONTGOMERY*

SYNOPSIS—A discussion of the excessive losses incident to leakage of air through stoppings. The author proposes a scheme for overcoming this by reducing the number of crosscuts. The plan has already been successfully applied in a number of instances.

The object of this article is to bring before mining men a plan whereby the ventilation of entries may be accomplished efficiently without the use of frequent crosscuts. The average distance to drive ahead of the air is about 60 ft., but with a method of ventilation such as herein outlined, it should be practical to drive at least 300 ft., and even a much greater distance if sufficient power is used.

It is important first to go into the cost of crosscuts. It may be claimed that the coal taken from these pays the expense of making them, but it must be remembered that the first cost is a small item. After the breakthrough is once made it becomes a serious matter to keep it tightly sealed up. Stoppings are built of many materials, and the cost varies according to the kind used. The average crosscut is about 50 sq.ft., and an 8-in. brick stopping will cost about \$15, a concrete stopping with an 8-in. wall will cost about \$10 and an 8-in. concrete block stopping about \$8. If stoppings were built of any of these materials, the leakage of air and their maintenance would be reduced to a minimum. In many coalfields the stoppings are built of gob material, rough lumber and tongue-and-groove lumber. With the use of these stoppings a great loss occurs in the ventilating current. When a portion of the air is short-circuited through the stoppings, it is obvious that the fan must handle a greater amount of air so as to get sufficient ventilation to the working faces.

Before taking up the cost of ventilation current it will be of especial interest to note the results of observations to determine the leakage of air through mine stoppings, as published in Bulletin No. 99 of the Bureau of Mines. The following results were obtained by taking the reading at 16 different mines, and it is of interest to note the small percentage of air which reaches the last crosscut:

Mine No.	Quantity of Air at Fan, Cu.Ft.	Quantity at Last Crosscut, Cu.Ft.	Percentage Reaching Last Crosscut
1	119,533	18,232	15.3
2	120,410	16,737	13.9
3	65,300	6,160	9.4
4	120,000	40,000	33.3
5	64,700	15,600	24.1
6	59,827	7,035	11.7
7	96,000	22,140	23.0
8	50,400	3,840	7.6
9	38,160	12,300	32.2
10	35,290	5,125	14.5
11	77,364	9,600	12.4
12	160,276	37,672	23.5
13	28,130	2,380	8.5
14	90,000	12,000	13.3
15	62,240	10,950	17.6
16	69,400	23,250	33.5

It will be noted that the average for the 16 mines shows that less than 20 per cent. of the air reaches the last crosscut. This might not hold true for the modern mines that are developed today, yet it is my experience in testing ventilating currents that few mines are able to show 40 per cent. of the air at the last crosscut.

What does that signify to the operator? It requires him to purchase a fan capable of handling three or four times

the air that his actual requirements demand. It also costs him many thousands of dollars each year handling the excess quantity of air which is short-circuited through the hundreds of stoppings in the mine. Furthermore, it necessitates high velocities in the main aircourses, creating more dust in suspension and endangering the mine.

It is interesting to note the cost of maintaining a ventilating current where 60 per cent. of the air is lost through defective stoppings. This involves a wide range of calculations, but the Bureau of Mines in its Bulletin No. 99 has figured this out on a practical basis. They represent a mine where the actual volume of air required is 36,000 cu.ft., costing approximately \$387 per year, but it is necessary for the fan to handle 90,000 cu.ft. at a cost of approximately \$3,444, owing to the fact that 60 per cent. is lost through stoppings. The power

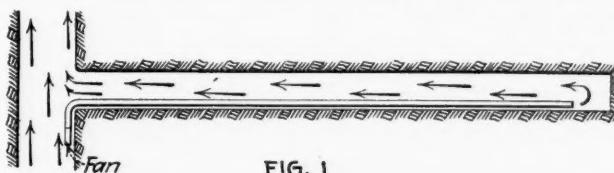


FIG. 1



FIG. 2

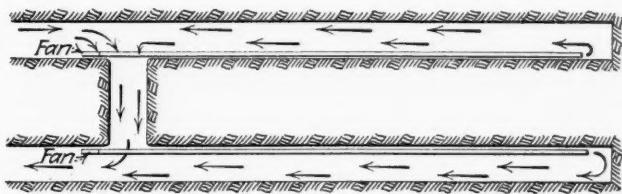


FIG. 3

SINGLE AND DOUBLE ENTRIES VENTILATED BY SMALL FANS

required to move a certain volume of air increases very rapidly as the volume increases. If leaky stoppings require the fan to handle double the quantity of air that is necessary for the ventilation proper, the power required is increased eight times.

It is thus seen that stoppings are an expensive proposition, and steps should be taken to eliminate the indiscriminate use of these in new development work. This can be accomplished by the use of auxiliary fans, as shown herewith.

Fig. 1 shows how a small fan is used for single-entry driving. Often a single entry will serve where it is necessary to drive a double entry for the purpose of securing ventilation. The fan may be placed either at the mouth of the entry and discharge the air to the face, or the reverse. The latter position will clear the entry of smoke quicker than the former.

*Columbus, Ohio.

Fig. 2 shows a single fan for double-entry driving. With this method five-sixths of the crosscuts can be eliminated. A canvas door is hung at the fan to prevent it from returning the same air again to the face. However, the percentage of air returned is very small, and I regard this as an unnecessary precautionary measure.

Fig. 3 shows two fans for double-entry driving. With the use of two it is possible to use a smaller fan and motor for each unit and eliminate the tubing through the crosscut. However, for practical purposes the single unit, as in Fig. 2, appears preferable. A single unit also simplifies electrical connections.

There are also other purposes to which these fans may be applied in coal mining, and one in particular is its use in rooms to drive out gob gas. The tubing used in connection with the fans is pliable, practically waterproof and air-tight. It is furnished in sections and fitted with coupling bands, which enables it to be carried close to the working faces at all times.

This apparatus consists essentially of a stepped multi-bladed blower, direct-connected to or belted from a motor. The equipment is manufactured by the Jeffrey Manufacturing Co., Columbus, Ohio, which has installed it in various mines with pronounced success.



Ball Bearings for Mine Motors

By A. H. MACCAFFRAY*

SYNOPSIS—A study of the advantages of using ball bearings, with particular reference to their application to mine locomotives. Their use is rapidly spreading, and some companies are even throwing out old machinery in order to install the new type of bearings. Accuracy of the alignment obtained in the motors materially increases their life.

There are many reasons for the selection of ball bearings for mine motors, both from the mechanical and the electrical point of view. There must be advantages, or such concerns as the Jeffrey Manufacturing Co., General Electric Co., Westinghouse Electric and Manufacturing Co., Morgan-Gardner Electric Co., Goodman Manufacturing Co. and Sullivan Machinery Co. would not specify or use ball bearings at materially greater cost. C. W. Larson, of the General Electric Co., mine locomotive department, in a recent article¹ drew particular attention to his reasons for adopting ball bearings, after exhaustive tests. They were:

1. Owing to the bearing strength and durability of ball bearings, the armature is prevented from sagging down on the poles, thus preventing burnouts.
2. Inasmuch as grease is substituted for oil and bearings are sealed on both sides, the commutator and windings are kept clean and the possibility of short-circuits and grounds is greatly reduced.
3. Increased efficiency, especially in comparison with plain bearings, not properly lubricated.
4. Bearings are built on the radial principle, with double row of balls, and thus carry about three times the number of balls as single-row bearings. This means longer life, as the pressure per ball becomes much less owing to greater number on which the load is divided.
5. The bearings are also self-aligning, which is a most excellent feature, as there is no binding to be encountered in mounting or in operation.

It is to be noted in the late type of locomotives that neither armature nor axle bearings project outward, this being due to the fact that each size of motor must be designed for maximum power at a minimum gage. Ball bearings take up materially less room latterly than any other type of anti-friction bearings. On account of the

narrow-gage conditions, each fraction of an inch must be accounted for, and consequently all dimensions must be kept to the minimum.

Mining machinery receives less care and attention than any other class of machinery. Where ordinary sleeve bearings are used, the bushings are allowed to wear out, and the armatures ultimately rub on the pole pieces until they are burned out. This condition has been practically overcome, as the ball bearings last a long time provided dirt is excluded and lubrication is applied occasionally. Many of the first ball bearings used on motors are still in operation.

INCREASED USE OF BALL BEARINGS

Concerns that have purchased machinery equipped with ball bearings in late years appreciate the advantages of them and very often go to great expense changing old machinery so as to use ball bearings. One manufacturer writes as follows:

"We have adopted the ball bearing as standard. Our reason for this is that they are self-aligning, and in case the bearing housings do not fit accurately in the field frames, there would be no undue strain on the ball bearings. Another reason is that there are many balls, and therefore the bearing runs smoother."

At first sight it might appear strange that the subject of motor commutation should have any influence upon the type of bearing employed. Good commutation is, however, directly dependent upon the accuracy and fineness of setting of motor bearings, regardless of their type. To secure the best results motor armatures must revolve closely and concentrically with the pole faces. Furthermore, particularly in coal mining, the revolving parts must be kept free from oil, which tends to accumulate dust, thus forming a carbonizing compound which endangers commutation and is extremely liable to cause flashovers.

In this respect the compact bearing heads employed in ball-bearing units and the effectual sealing of the lubricant chambers have proved of immense value. Protected from the lubricant, the commutators retain their finish and the brushes are kept free from an accumulation of dust.

Another factor which strongly affects commutation is the maintenance of the air gap. Plain bearings are subject to a continuous rubbing action which causes wear on the bearing surfaces, frequently allowing the shaft to

*50 Church St., New York City.

¹"General Electric Review," April, 1915.

settle out of the true center of the magnetic field, thus necessitating frequent gaging of the air gap and inspection and possible replacement or renewal of the bearing linings.

On ball-bearing machines this wear is practically eliminated, as hardened steel balls roll on hardened steel races. Rolling action is substituted for rubbing, and practically continuous accuracy is secured. Self-alignment in ball bearings provides for the sudden impulses of load without binding and insures the best possible load distribution with a minimum pressure per ball.

RESULTS OBTAINED WITH BALL BEARINGS

An example of the results secured with ball bearings is shown in one removed from the pinion end of a mining locomotive after two years of continual service. During this time the locomotive had traveled approximately 60,000 miles. The bearing showed no appreciable wear and was immediately returned to service.

Instead of repeated attention to bearings, as is required in plain bearing machines, a weekly filling of the grease cup and an occasional inspection insure long life and the elimination of bearing troubles where ball bearings are employed. It should be borne in mind, however, that despite the extremely small coefficient of friction for ball bearings, it is absolutely essential that they be lubricated.

The advantages of ball bearings as applied to mine locomotive motors may be summed up as follows: Freedom from repairs, a material reduction in the amount of lubricant required, long intervals between inspection, good commutation, and decreased wear on the gearing.

What is probably more important so far as coal mining is concerned, the locomotives are more dependable and are more nearly in constant commission instead of being in the repair shop.

Thoughts To Think About

There is no way to judge the future by the past.

No man can read with profit that which he cannot learn to read with pleasure.

It is the taxes of our idleness, our folly and our pride, rather than of our government, that weigh so heavy.

Old men do not regret so much that opportunities were not abundant, but that the ones they had were so often missed.

If every man would pursue his career as if he had but a day to live and a great object yet to accomplish, there would be few failures.

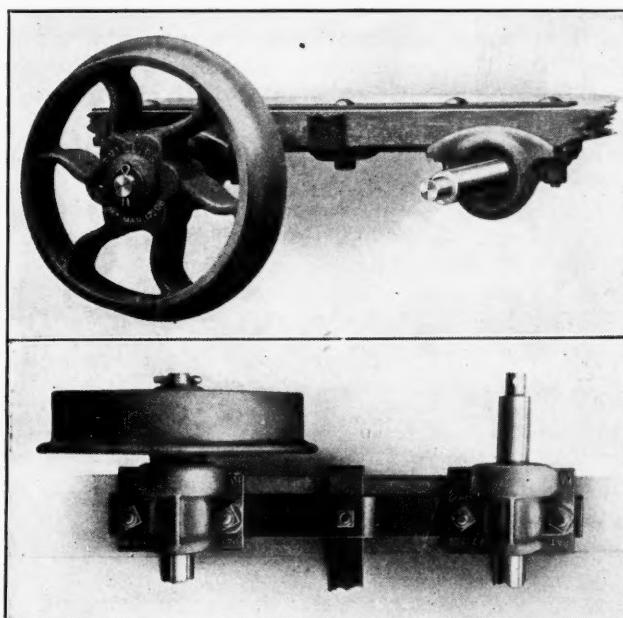
Thomas Jefferson drafted the Declaration of Independence when 33; Napoleon was emperor of France at 35; Daniel Webster was the leading lawyer of the United States when 36. Youth is no barrier.

A man may be able to design a high building or a great bridge and yet be unable to properly lay a brick or saw a timber. A writer may attain great fame because of his thoughts sublime and yet be unable to spell correctly—which proves the supremacy of the creative mind over the imitative.

Mine Car Trucks with Open-Cap Wheels

About eight years ago the Phillips Mine and Mill Supply Co. placed upon the market its patent open-cap truck for mine cars. While this truck represented a radical departure from existing practice it was immediately received with favor. At present one coal-mining firm has 11,226 of these trucks in use, another has 2,239, another 3,007, while still another has 13,436 trucks. These figures show clearly how heavy has been the distribution of this device.

These trucks were furnished not only on new cars which were built complete in the Phillips company's shops, as well as those supplied to other builders who were under instructions from their customers to use them, but they also replaced old-style running gear which would not have been profitable to continue longer in service, in view of the economy afforded by this type of truck. These



SIDE AND BOTTOM VIEW OF THE TRUCKS

economies are real and tangible, as is evidenced by the fact that many concerns have discarded immense quantities of old-style wheels and axles in order to equip their cars with the Phillips trucks exclusively.

With many of the old square axles and straight-bored wheels it was difficult to hold the axle in place securely and the wheel could not contain sufficient lubricant for any length of time. It was difficult, if not impossible, to get the oil or grease to the back of the wheel hub where it was needed for effective lubrication, and in consequence the wheels wore out internally, especially at the back, while being otherwise in good condition. The axles on account of the wear coming mainly at one point wore oval, the journal assuming a cross-sectional shape not unlike that of a pick handle. The cars were consequently hard to move as the result of this excessive friction.

The open-cap wheel obviates this difficulty, and in many of even the first trucks put in use no wear on the axles or wheels is perceptible, and the polished surface of the cold-rolled steel axle is not even scratched. Not only is internal wear eliminated, but sideplay of the axle in

the journal box is impossible. There are only two bolts in each journal box and ten in the complete truck, permitting it to be easily and quickly applied or removed from the car.

The axle can be removed by withdrawing one linchpin and pulling the axle through the boxes without removing the latter. Double stirrups connect the boxes to the car bottom and prevent them from shifting. The axles are thus held in true alignment with the track at all times, and the calculated play between the wheel gage and track gage cannot be exceeded. Either grease or oil can be used as a lubricant, and the pull required to move a car equipped with this type of truck is much less than that ordinarily required for cars with straight-bored wheels and cold-rolled steel axles.

The elimination of internal wear appeals to all operators, while an easy running car is something which they all desire. With semifluid grease, which is difficult if not impossible to retain in an ordinary straight-bored wheel, the open cap wheels will run for six to eight months with one lubrication, and are being thus operated in many mines. One large operator who is using about 1,500 of these trucks under cars of 3-ton capacity recently completed a test which showed that he ran a number of cars equipped with this truck for 27 months with one filling of grease.

While this test is an interesting one and doubtless other instances could be found where cars have been operated for an equal length of time without lubrication, it would hardly be advisable for any operator to attempt to run his cars either equipped with this type of truck or any other for a period of over two years without at least care-

delay, had been threatening to take some action against the companies who, as rumor had it, did not intend to refund the tax. However, much satisfaction is manifested now that the situation is clearing.

It is also interesting to note the varying attitudes of the dealers receiving the refund. Some have rendered a bill claiming interest on the amount of tax, and assuming an arrogant attitude; they do not seem to realize the large expense to which the companies were put to contest the law, not to mention the great additional expense of accounting, incident to the collecting and refunding of the tax.

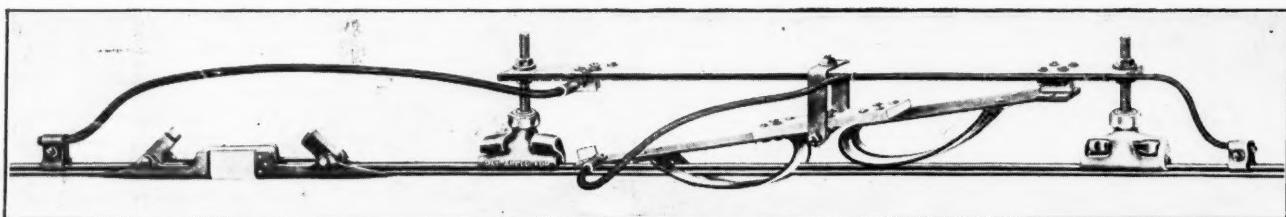
On the other hand, many of the dealers are extremely grateful and are at pains to say so. Some of the letters received by the mining companies are a big surprise to them, so unusual is it for them to receive commendation about any feature of their business.

The incident is related of one dealer who when told to send in his bill could not believe the news and thought at first his informant was joking with him. When he was assured that he was entitled to over a thousand dollars, he said he had never expected to receive any refund, and as a consequence had never kept account of the amount of the tax.



New Automatic Electric Switch

A new type of automatic electric switch and section insulator has been placed upon the market by the American Mine Door Co., of Canton, Ohio. The accompanying illustration, which shows this switch installed in connection with a section insulator, needs but little



THE AUTOMATIC SWITCH INSTALLED WITH A SECTION INSULATOR

ful inspection every six months or thereabout. The test mentioned, however, well demonstrates what neglect these wheels will stand under certain circumstances without injury.



Progress of the Pennsylvania Tax Refund

The refund of the Pennsylvania state tax continues a topic of much interest in the anthracite industry. So far the refund has only been made by three of the larger companies, which in selling their coal under the tax law rendered bills with the tax itemized. It is now learned, however, that another large company, which simply added the tax in the cost of the coal, is preparing a circular to be sent to its customers advising them that it too will now make the refund. This news will be received with great interest by the dealers, and also by those individual operators who billed their coal in a similar manner. The smaller concerns have been waiting to see what the larger companies would do in this respect. Some of the retail dealers, becoming anxious at the

explanation. As may be readily seen, the switch is operated by the trolley wheel when passing in either direction in such a manner as to energize the section of trolley wire extending to the left of the instrument when the locomotive is passing in that direction and to cut off the power from this section when the locomotive returns.

This device can be attached to the trolley wire with but little work, and as the switch is separate from the insulated splice, objectionable arcing is entirely eliminated. When it is desirable to install electrically operated signals in connection with this section insulator, it may be readily accomplished. When such signals are to be operated successively for each trip, the switch can be wired to turn on a red light when the motor approaches and a green light indicating safety after passing it.

When a selective signal is required, the switch may be placed on a short parallel trolley wire, and the motorman need only push gently on the trolley pole to make the wheel take the branch, when the switch will turn on any desired signal light for which it may be connected. The simplicity and reliability of this arrangement, as well as the ease with which it may be installed, will commend it forcibly to mine electricians.

Storage-Battery Locomotive in a Coal Mine

BY F. J. FOLEY*

SYNOPSIS—*Sleep adverse grades rendered mule haulage unsatisfactory and expensive. The storage-battery locomotive even under decided disadvantages has handled the output with success.*

An example of the successful operation of storage-battery locomotives under conditions where it was thought this type of apparatus would not do the work is the installation in the Ocean No. 2 mine of the Pittsburgh Coal Co.

In this mine the service requirements were so severe that mules could not do the work satisfactorily, and the expense and difficulty of handling the output in any other way made the storage-battery locomotive the only available means.

Although the Pittsburgh Coal Co. doubted that these locomotives could do the work, it installed one about

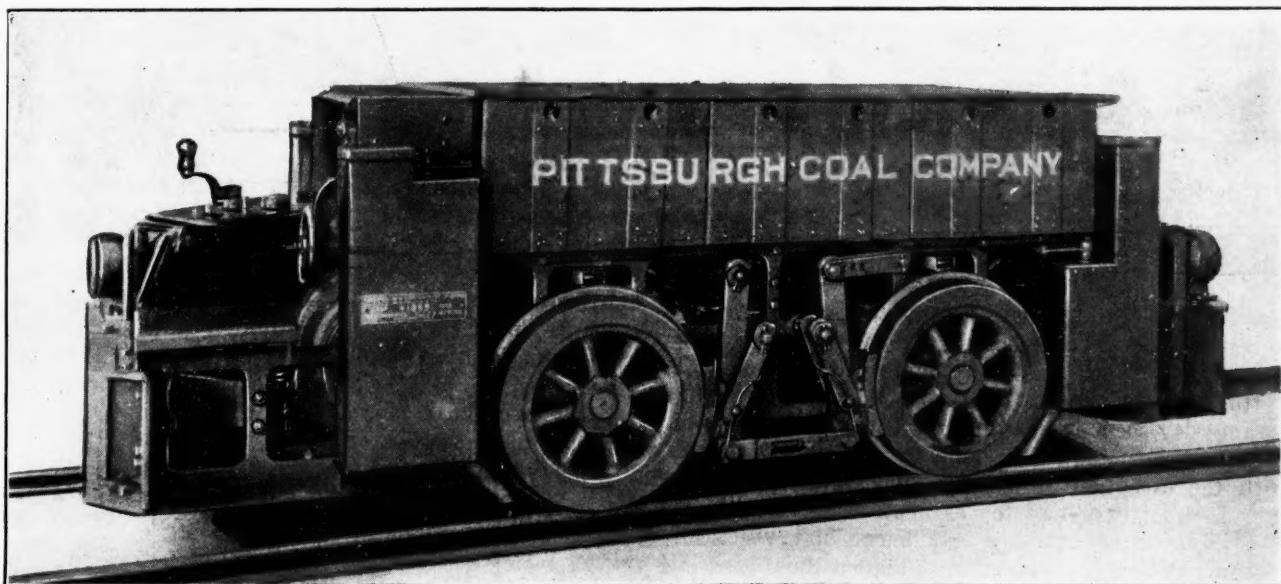
of the automatic braking screw type and the brake shoes were of standard MCB construction.

The batteries consisted of 80 Edison A8 cells mounted in 12 trays, 11 with 7 cells each and one 3-cell tray. The battery box is of sheet steel lined with wood. It is held in place on the locomotive by flanges on the frame and so arranged that it can be easily removed.

SPECIALLY DESIGNED MOTORS WERE EMPLOYED

The motors are especially designed for battery work and are of rugged construction. They are of the totally inclosed type to eliminate the danger of explosion due to the presence of explosive gases in the mine. A special control is used with this outfit which has but one resistance point and allows the motors to operate with a minimum demand on the battery.

The motors are supported in a cast-steel cradle, one end of which bears on the axle, the other being spring-



SIDE VIEW OF THE STORAGE BATTERY LOCOMOTIVE

one year ago, and the performance of the locomotive has been successful in every way.

The average number of cars hauled per day in the mine is 135. The weight of the car empty is 2,000 lb., each having a 2-ton capacity, making a total weight of 6,000 lb. when loaded. The grades of the mine are severe. One of 14 per cent. for 220 ft. and another of 3 per cent. for 700 ft. were the most prominent.

The locomotive built to handle this work was 10 ft. 6 in. long, 4 ft. 4½ in. wide, 3 ft. 11 in. high and weighed 10,900 lb. It was equipped with two V49 type 80-volt ball-bearing motors, outside hung. Double-reduction gears of the spur type were used, giving a total ratio of 16 to 1, in two reductions, the first of 20 to 68 and the second of 16 to 76. The frames were of the well-known "Barsteel" construction, the brakes were

hung to the frame. This is equivalent to the suspension used on street railway motors. The entire cradle with gearing can be easily removed and the motors taken from their support. Oil and waste lubrication is used on the bearings of the cradle.

Each motor is connected to one axle by double-reduction gearing, the gears being of steel with machined teeth. Both reductions are covered by cases, and the gear on the axle is split to make removal easy. The machine thus corresponds closely to standard construction of trolley motors. A series of tests made on this locomotive showed the possible performance of a machine of this type.

With a six-car trip on a 12.8-per cent. grade, total weight of train exclusive of locomotive 33,600 lb., the wheels slipped and the locomotive stalled. Sand was applied to the rails, and the locomotive started and hauled the load to the top of the grade, a distance of

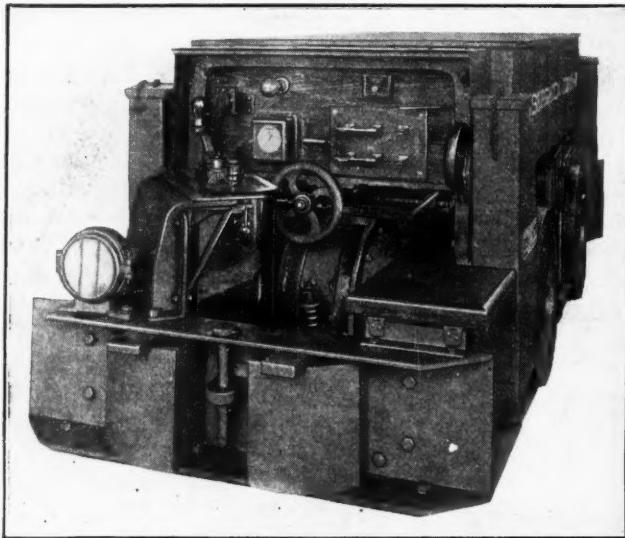
*East Pittsburgh, Penn.

about 200 ft. A list of tests made on this locomotive follows:

No.	Weight, Lb.	Time, Seconds	Power, Amp.-Hr.	Power, Watt-Hr.
1	6,925	45.0	2.76	232
2	12,845	51.0	4.00	320
3	18,770	61.6	5.68	436
4	23,195	69.0	7.28	538
5	28,220	90.0	9.04	700

After these tests the locomotive was coupled to two 20-ton locomotives and hauled them 3,700 ft. in 6 min. 39 sec., with an ampere-hour consumption of 11.92 and a watt-hour consumption of 996.

This locomotive has been in operation about one year, and the daily performance has been exceptionally good.



END VIEW OF LOCOMOTIVE, SHOWING CONTROL DEVICES

There are 25 working days during the month, and the average number of cars hauled per day was 135. This includes the hauling out of the loaded cars and the spotting of the empties. At no time was any of the working day spent in charging the batteries. The power consumption per day was found to average 312 amp.hr. With the exception of a few minor adjustments soon after the installation of the locomotives, no trouble has been experienced with the equipment and practically nothing has been spent on repairs to either the mechanical or electrical parts.

A table showing the amount of work done by this locomotive during a two weeks' period follows:

Date	Empty Cars	Cars Loaded with Coal	Cars Loaded with Slate	Amp.- Hours
4	65	65	24	270
5	50	89	8	290
9	98	112	10	344
10	108	116	13	285
12	110	125	10	280
15	112	126	7	320
16	118	122	4	305
18	106	107	13	345
19	125	128	10	305

■

Transportation to Pacific Coast

In response to a recent request for bids by the Navy Department for the transportation of 5,000 tons of coal from Hampton Roads to the Pacific Coast, only one tender was received, this being \$12 per ton exclusive of the Panama-Canal tolls. In event of the canal not being open to transportation on the arrival of the vessel, the shipper agreed to discharge at Colon at a rate of \$6 per

ton. These exceedingly high rates have forced the department to an entirely new departure; namely, requesting bids for transportation by rail. Under date of Mar. 24 the department has issued the following request for tenders:

Bids will be received until noon, Apr. 7, for the transportation of about 5,000 tons of coal to the naval coal depot at Tiburon, Calif. Offers are solicited for transportation either by rail or water.

In the case of transportation in merchant bottoms the vessel will load at Hampton Roads, Va., and the usual conditions in regard to loading and discharge will govern, this department guaranteeing a daily discharge rate of 400 tons.

In the case of all-rail transportation being accepted the coal will be loaded at the mines of the Crozier-Pocahontas Co., on the Norfolk & Western, in McDowell County, West Virginia, and delivery will be required on floats alongside the steel wharf at the naval coal depot, Tiburon, the Government guaranteeing a daily discharge rate of not less than 500 tons. The usual rate of demurrage will be allowed in case this rate of discharge is not maintained, it being understood that the railroad company will deliver the cars at the mine in such order as will avoid demurrage.

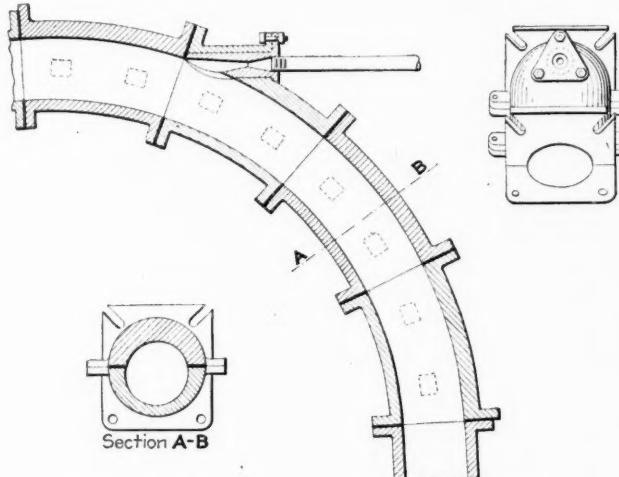
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An Ash-Conveyor System

The power of air moving at high velocity to transport various granular materials has long been known, and many devices have been constructed to utilize this as a means of ash disposal from power plants. Some time ago the Girtanner-Daviess Engineering and Contracting Co., of St. Louis, Mo., placed upon the market the G.-D. ash-ejector system. This is one of the simplest arrangements of the kind at present in use.

In this system the current of air is generated by a jet of steam which is introduced into the conveyor pipe much as is done in the ordinary water injector used for feeding boilers. By this means a strong suction of air is induced in the conveyor pipe on one side of the steam nozzle, while a pressure exists upon the other. Ashes are introduced into the pipe through suitable openings on the suction side of the nozzle and may be discharged into a suitable tank or receptacle on the pressure side, or they may be discharged onto a dump or direct into vehicles, through the medium of a target box.

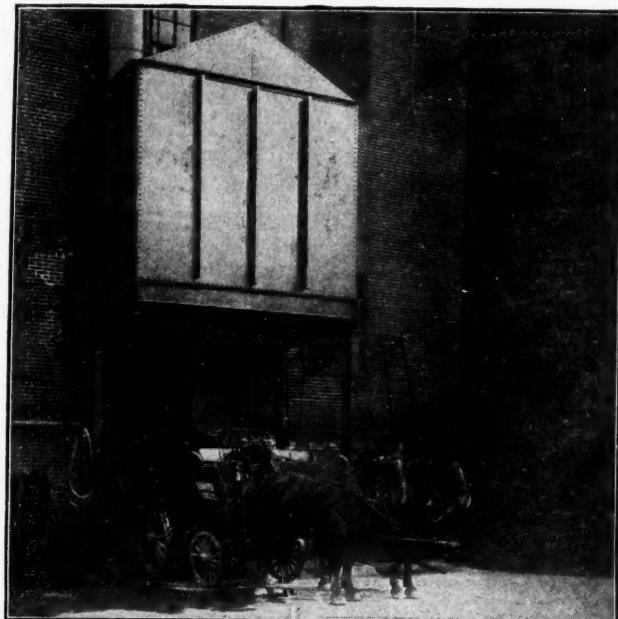
This system has now been perfected to such a point that 35 lb. of steam per minute at a pressure of 110 lb. at the nozzle will convey about 200 lb. of ashes. Where the steam pressure is higher more steam will be used, but a



CROSS-SECTION OF STEAM NOZZLE AND CONVEYOR PIPE AT A BEND

larger quantity of ashes may be transported. Plants have been equipped with this system which contained from 18 to 20 boilers, and the ashes are handled without manual labor other than that required to feed the line. Dust is done away with without the necessity of sprinkling the ashes. By discharging the ashes vertically, allowing them to precipitate by gravity they do not pack in the bin.

When ashes are handled by the steam jet system, dust is allayed, while at the same time there is no danger of fire in the ash bin. There is further no liability whatever



ASH BIN AT END OF CONVEYOR

of gas explosion in the ash receptacle which might be caused by the deposition of live coals from the ash-carrying system. Furthermore, by the use of steam the ashes are effectively quenched without becoming wet enough to freeze in cold weather.

As may be seen in the accompanying drawing, the back of the elbow in the conveyor pipe, where the greatest wear and abrasion necessarily take place, is made extra thick. Furthermore, since the elbow is made up of several sections, each consisting of a back and front portion bolted together and forming a segment of the curve, the rear half of any segment may be removed and renewed at any time. In the event that a pipe segment should be worn through and it is inconvenient to make an immediate repair, wood or other material may be bound against the opening and the system operated for the time being or until an opportunity may be secured for a thorough and workmanlike repair.

There are no moving parts in this ash-ejector system. The only things that move are the steam, air and ashes. All expense incident to the wear and tear and upkeep of moving parts or machinery, lubrication, etc., are dispensed with. All parts of the pipes are composed of a special chilled iron which has been designed to withstand the action caused by rapidly moving ashes; consequently, portions of the pipe which are subject to the abrasion of the moving material last many times as long as they would if composed of ordinary cast or gray iron.

While the expenditure of steam for the weight of material handled may at first appear high, nevertheless

this should hardly exceed 4 to 6c. for steam per ton of ashes handled; and it should be remembered that there is no expense in the maintenance of delicate machinery which requires constant attention and lubrication. This also eliminates the interest, depreciation, etc., on such machinery. This saving probably more than offsets the high consumption of the steam necessary.

By the use of the steam jet system, power is used in its cheapest form; no power-house equipment, such as engines, generators, etc., is needed. This system has been installed in a number of coal-mine power houses and appeals strongly to operators, since coal is cheaper at the mine than anywhere else, whereas labor is frequently higher.

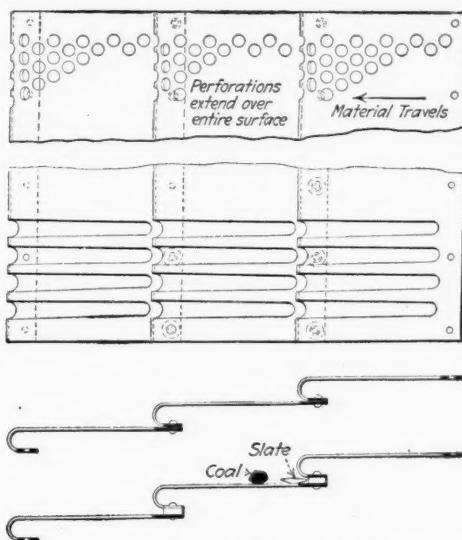
New Step Perforated Screen

A new type of step perforated screen for coal preparation has been recently placed on the market by the Cross Engineering Co., of Carbondale, Penn. This will be known as the Lee improved lip screen, patent on which has been applied for. The first installation of this screen is being made at the West End Coal Co. colliery, at Mocanaqua.

This screen consists of separate segments of any desired width and length bent in a circular arc at the point of connection, thus forming steps of any desired height. The segments are held in place by ordinary bolts or they may be riveted if desired.

The makers claim that this screen offers greater flexibility than one made of a single flat plate. By making the screen in sections each section is renewable when more worn than the other sections, thus prolonging the active life of the whole screen. Greater flexibility is also secured in adjustment and in holding the screen plate in the frame by employing separate segments; this construction stiffens the screen and prevents sagging at the centers. This arrangement also increases efficiency through a more equal distribution of the material handled over the surface of the screen, the steps of varying height as required giving various effects in the tumbling of the coal to meet local conditions.

This screen offers less liability to clog than any other form of step screen, as at the lower end of the perforation (at the step or connecting point) the perforations



PLAN AND SECTION OF NEW PERFORATED SCREEN

are fully open. The screen may be employed as an automatic picker of flat or undersized material by separating adjacent segments by washers of varying thickness. The perforations also may be made round, oblong, square or slotted.

The minimum height of step depends upon the thickness of the screen plate. These may, however, be made as follows: Screen plates lighter than $\frac{3}{16}$ in., minimum height of step $\frac{7}{8}$ in.; $\frac{3}{16}$ to $\frac{1}{4}$ in., minimum height $1\frac{1}{4}$ in.; heavier than $\frac{1}{4}$ in. plate, minimum height $1\frac{3}{8}$ in. Several orders have been received for installation in the anthracite region and many inquiries for further information from the bituminous and splint coal fields. Screens to fill these orders will of course be built and installed as rapidly as possible.

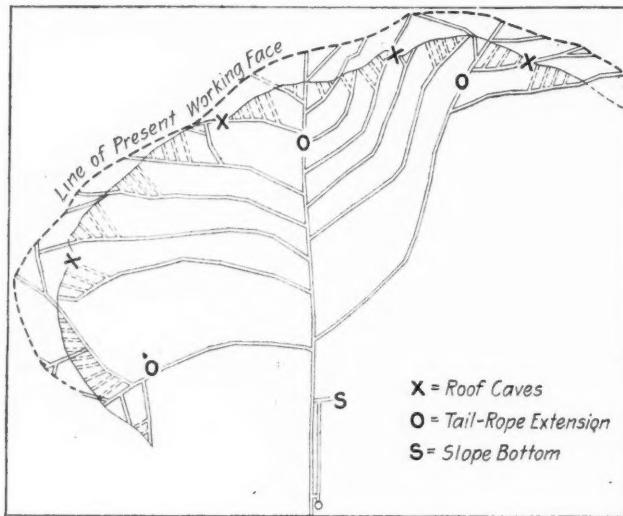
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A Longwall Mine Reorganized

BY WILLIAM JAMES*

As an illustration of a successful reorganization of an old longwall mine that through lack of good management and a practical method of development had got into poor shape, I want to describe briefly what took place when this mine fell into new hands—parties that understood and appreciated the value of efficient and up-to-date methods of mining and equipment.

For five years previous to the change that I have mentioned as taking place, this mine had been a poorly paying proposition. It was a longwall mine opened by a slope operated by a tailrope that extended about 400 yd. from



AN OLD LONGWALL MINE REMODELED

the mouth of the slope into the mine. The distance from the general working face to the mouth of the slope was about a mile.

As shown in the drawing, which represents roughly the general plan of the mine, there was a great extent of roads to be kept open, which also meant a large expense for mule haulage and maintenance. At the four different points marked X on the plan, heavy roof falls occurred, owing to these places having lagged behind the others, thereby producing a zigzag line of longwall face, instead of one which was continuous and regular. As a result, four dayhands were kept constantly employed

*Mystic, Iowa.

cleaning up falls and keeping the face open, because the falls blocked the ventilation.

Under these conditions the expense was further increased by reason of many of the miners being obliged to push their coal a greater distance than the 125 ft. which was the limit specified in a working agreement that provided for a payment of 10c. per ton when coal must be pushed a greater distance than this, and in some cases the rate paid varied from 15 to 20c. per ton.

Under the new management the first step taken underground was to divide the mine into three districts, straighten up the longwall face and drive cross-entries to the southeast and southwest, which eventually cut off nine entries that formed long haulage roads in the old system. The straightening of the working face distributed the roof pressure more evenly on the coal, and we had no further trouble with falls of roof at the face. As a result we were able to dispense with the four dayhands who were previously employed regularly to keep the face open. This meant a great saving in the working expenses of the mine.

Another step taken a little later was to extend the tailrope system in three directions into the mine to the points marked O in the figure. After the extension of the tailrope, six mules were able to do the work of the nine mules previously employed; but it soon developed that we were short of cars under the new working conditions, and for awhile the tailrope system had to be operated at a disadvantage because, instead of bringing out 30 to 35 cars a trip, we were only able to secure trips of 16 to 22 cars.

While this condition lasted, we figured that we were losing from 40 to 50 tons of coal a day, although our output had greatly increased. For example, in the first two days of the operation of the extended tailrope system, the output of the mine increased from 140 to 190 tons a day, and later, when the car supply was sufficient for all requirements, this output was increased to 300 tons a day, which made it the largest output of any of the ten mines located in that district. Under the old system, also, it was a frequent occurrence to have a mule's leg broken by reason of the great crowding of mules and cars on the main parting, where the trips were made up for the tailrope ready to be hauled out of the mine. During the past five years since the reorganization we have had no accident of this kind.

COMING MEETINGS

American Society of Civil Engineers will hold its annual convention at Pittsburgh, Penn., June 27-30.

Illinois and Wisconsin Retail Coal Dealers Association will hold its next annual convention on July 26 and 27 at Madison, Wis.

Kentucky Mining Institute will hold its annual meeting and first-aid contest at Lexington, Ky., May 12 and 13. Secretary, Ivan P. Tashof, Lexington, Ky.

American Society of Mechanical Engineers will hold its spring meeting at New Orleans, La., Apr. 11-14, 1916. Secretary, Calvin W. Rice, 29 W. 39th St., New York City.

Byproduct Coke Producers' Association of America, formed in Chicago on Jan. 14 last, will hold its first annual meeting in Boston, Mass., on July 14, lasting probably two or three days.

International Railway Fuel Association will hold its eighth annual convention at the Hotel Sherman, Chicago, Ill., May 15-18. Secretary, J. G. Crawford, fuel engineer, Chicago, Burlington & Quincy R.R., Chicago, Ill.

Who's Who in Coal Mining

H. M. Crankshaw

Young men are rapidly coming to the front in the anthracite field, and none is taken more seriously or has earned recognition more quickly than Hugh Crankshaw, manager of the Harwood Coal Co., at Hazleton, Penn.

Born in Lancashire, England, in 1883, Mr. Crankshaw secured his early schooling in his native country, later receiving a bachelor of science degree from Victoria University, Manchester, England. One year later, in 1907, he was successful in securing a first-class colliery manager's certificate at Newcastle, England, and immediately left his home shores for new fields, locating first in Mexico, where he engaged in miscellaneous mining work.

In college Mr. Crankshaw took an active part in athletics, winning the fencing championship of Manches-

ter University in his freshman year and holding the title throughout his entire college course. His love for athletics has never diminished, and although his participation in various forms of sport is not now so strenuous, he is still devoted to all forms of healthy recreation. Golf is his particular fad at the present time.

Immediately after landing in Mexico in 1907, Mr. Crankshaw devoted several weeks to visiting isolated mining camps, riding more than 2,000 miles on horseback. In 1909, while serving as chief engineer for the Cia. Carbonifera de Sabinas, he took some of his firebosses

and foremen to the colliery of a neighboring company where an explosion had occurred and there directed the work of opening up the damaged mine and restoring ventilation. For this work the Mexican government gave him a medal, suitably inscribed, which he still retains among his treasured possessions.

In 1910 he was appointed assistant general superintendent of the Mexican Coal and Coke Co., and in 1911 left Mexico to accept the position of superintendent of the New River Collieries Co., at Eecles, W. Va. In 1912 he was appointed district superintendent of the Lehigh Coal and Navigation Co., in charge of the Lansford district, and in 1915 was made manager of the Harwood Coal Co., at Hazleton, Penn., which position he still occupies.

Mr. Crankshaw is a member of the Institute of Mining Engineers in England, the American Institute of Mining Engineers and the Royal Societies Club of England. He is the type of man who puts his whole heart into whatever task he sets out to perform. He is enthusiastic about his work, his friends and all that enters closely into his life. Ever playing the game with his cards on the table, his motives are not questioned by those who pull with him or those who pull against him—friend or foe can find out where Hugh Crankshaw stands on any matter simply by asking him. The result is that he enjoys the confidence of the men he works for and the trust of those who work for him. Not many young men have delved so deeply, so persistently and so unwaveringly into the intricacies of coal mining as he has, and the coal industry of America is better off for his being a part of it.



James E. Roderick

For the benefit of the younger generation and those who sometimes despair of their lot in life because of circumstances, educational or financial, a brief sketch of the present chief of the Department of Mines of Pennsylvania, Hon. James E. Roderick, is offered for the Success Number of *Coal Age*.

His biographical notice in Smull's, which introduces Pennsylvanians to their public servants at Harrisburg, closes with the sentence, "He is a member of the First Presbyterian Church at Hazleton and a director of the Hazleton National Bank."

This summing up presents tersely the character features of a citizen who is well worthy of space in the Who's Who department of *Coal Age*. Mr. Roderick's achievements serve well as an example of the possibilities open to all ambitious youths. Mr. Roderick has never appeared in the class of industrial captains or financial wizards, but he has attained such a measure of success in both of these fields as would give him an entrance to their councils. It is probably this fact that has kept him in the ranks of workers and retained for him the esteem of his fellow citizens. While he is chief of the Department of Mines and well sustains the dignity of that important



HUGH M. CRANKSHAW

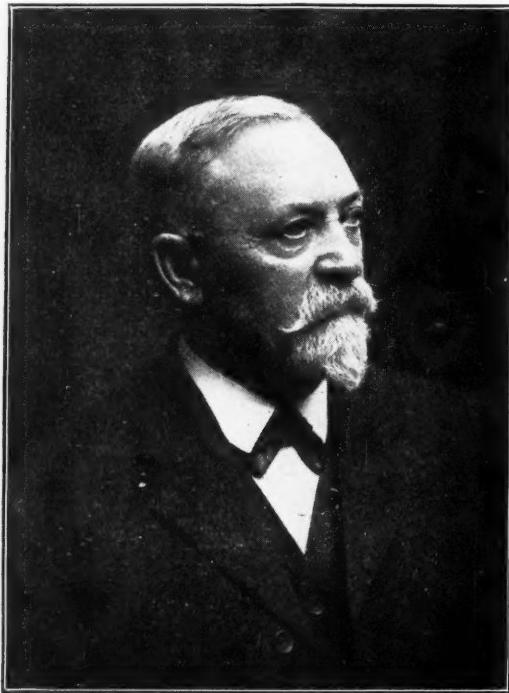
General manager of the Harwood Coal Co., Hazleton, Penn.

ter University in his freshman year and holding the title throughout his entire college course. His love for athletics has never diminished, and although his participation in various forms of sport is not now so strenuous, he is still devoted to all forms of healthy recreation. Golf is his particular fad at the present time.

Immediately after landing in Mexico in 1907, Mr. Crankshaw devoted several weeks to visiting isolated mining camps, riding more than 2,000 miles on horseback. In 1909, while serving as chief engineer for the Cia. Carbonifera de Sabinas, he took some of his firebosses

post, he is still greeted familiarly by the men who worked under his direction as youthful toilers in the mines, and their greeting is returned in that hearty way which comes from mutual respect and confidence.

The mining industry has developed some remarkable men in Pennsylvania—men who have builded that others might enjoy better advantages in life; men who have solved difficult problems that the industry with which they were identified might succeed and today represent fabulous



JAMES E. RODERICK
Chief of the Department of Mines of Pennsylvania

industrial interests that go into council with the toilers and try to amicably smooth out the wrinkles and insure a system of industrial peace. These are the real big men, because as they have grown and developed they have not lost sight of the human side of the industrial problem. Even though we may not know them, theirs is the satisfaction of earning the encomium pronounced by Cicero when he said, "Of all human doings, none is more honorable, none more estimable than to deserve well of the state." Such a man is James E. Roderick.

Mr. Roderick is now entering his 75th year. Since he quit school in South Wales at the age of 13, he has continued the grind of labor practically without interruption. At that tender age he began work in the mines, and continued for five years, when he came to this country and located at Pittston, Penn., where he began life as a miner's laborer, advanced in the scale to miner, and in 1866 assumed his first job as mine foreman for the Wilkes-Barre Coal and Iron Co. at its Empire shaft.

After four years as mine foreman Mr. Roderick was made superintendent for the Warrior Run Mining Co. and in 1881 he was made mine inspector for the Hazleton anthracite district. In 1889 Linderman & Skeer, operating the Stockton mines, secured his services as general superintendent, and when their lease expired in 1896, Mr. Roderick was selected as general manager for the A. S. Van Wickle mining interests.

It was about this time that the United Mine Workers of America began to show activity in the hard-coal section of Pennsylvania. Starting in with the Honey Brook district near McAdoo, which is in the lower edge of the Lehigh field, John Fahey, then the organizer, had wonderful success in enrolling members; and it was not long until acute issues were raised between the union and the mine operators. In this movement the Van Wickle mining interests could not escape attention. There were no arbitration committees then to discuss matters, and things were warming up all around for the big test of strength that was to come later. The turmoil being intense and threatening, Mr. Roderick was the first to open negotiations for equalizing wages in the lower Lehigh field. At the time it was regarded merely as an adroit evasion, even by some of his fellow employers, but it eventually became the basic principle of settling disputes for all. It so happened the writer was then following, in a newspaper way, the affairs of that district and was quite familiar with events as they transpired. This is not written in eulogy, however, but merely as a brief review of a career that is worth while. In 1899 Mr. Roderick was appointed chief of the Bureau of Mines under Governor Stone. In 1903 Governor Pennypacker made him chief of the Department of Mines, which position he still holds. He was selected a member of the commission appointed by Governor Beaver to build the State Hospital at Hazleton and is at present one of its trustees. In his home town of Hazleton he has been identified with many movements for public improvement and served as school director and member of the borough council.

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Henry Gassaway Davis

Like many another great industry, coal mining had its "Grand Old Man," and in the death of Henry G. Davis on Mar. 11 a unique and inspiring figure passed to the great unknown. We often speak of a rugged character, a man of purpose, a person of high aims and ideas, an individual possessing grit and determination—H. G. Davis was the personification of all these. He was all that is best of the "old school," the kind of man who has been and will be held up as an example for young Americans to follow.

Born in Maryland in 1823, he lived 93 years of life, and much longer than that of service. Some men live 365 days every year; there are others who exist only a couple of months in each twelve; while there are a few whose life is not measured in days, but in deeds. The "Grand Old Man" was a worthy member of the latter class.

Descending from Revolutionary stock and having the advantage of spending his early life on a farm with Mother Nature as his principal teacher, Mr. Davis started life well-equipped for a strenuous struggle. The fight commenced when he was 15, for at this age he started working for a neighbor on a farm at 25c. per day. In the wintertime for several years he got a little schooling, but this was soon ended, for he was early made bread-winner for the family. At 19 he secured a position as freight brakeman on the Baltimore & Ohio R.R. In those days railroading was a hazardous occupation, for there were no self-couplers, airbrakes and other safety devices such as are in use today. The division on which he worked extended from Baltimore to Cumberland, Md.

After serving a year as brakeman he was promoted to freight conductor, and later was again promoted to passenger conductor, being known on his run as "Captain" Davis.

His early hardships tended to make him businesslike, and above all other things impressed him with the true value of a dollar. His early poverty, therefore, was a blessing in disguise and laid the foundation for ideas that shaped his life to such a successful end. While serving the railroad Mr. Davis became acquainted with Henry Clay, and this intimacy which developed while Mr. Clay was traveling from Cumberland to Washington later ripened into a lifelong friendship.

President Swan of the Baltimore & Ohio soon discovered the remarkable possibilities in the young conductor who was working for him, and accordingly appointed Mr. Davis division superintendent—a position which in fact made him the right-hand man of the president of the road. During all these vicissitudes of his railroad career, he was not blind to the opportunities that presented themselves through the medium of West Virginia's natural resources. It was this recognition of the country's opportunities that caused him to seek and secure appointment as agent for the railroad company at Piedmont, W. Va.

Shortly after this Mr. Davis severed his connection with the B. & O. and entered the mercantile, lumber

which he secured for furnishing food and other supplies to the soldiers.

Having accumulated sufficient wealth to insure his independence, his ambitions turned into political channels. His friendship for Henry Clay had made him a devoted Whig, and his first ballot was cast for the Kentuckian. In 1866 Mr. Davis was elected to the West Virginia Legislature. Two years later he was elected to the State Senate, and a little later became the leader of his party in the state.

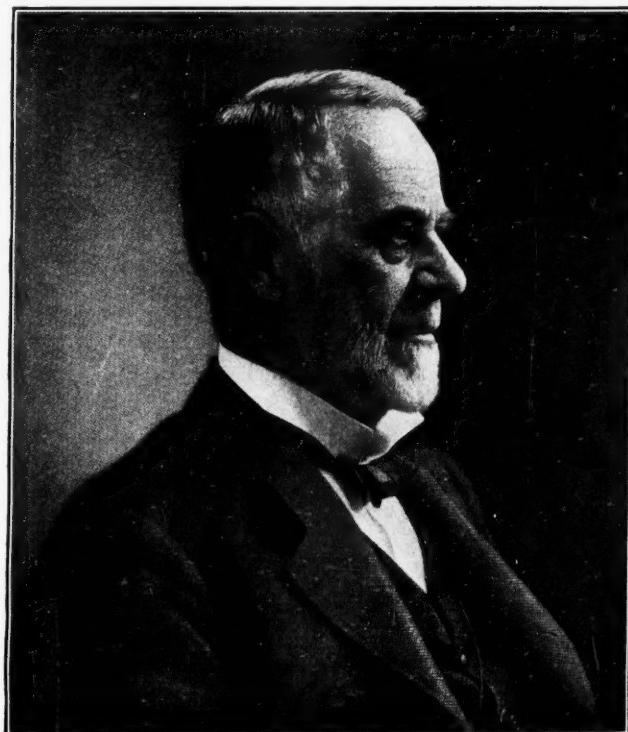
In 1870 Mr. Davis was elected to the United States Senate, and in 1876 was sent back for a second term. His business interests had been expanding so rapidly, however, that he voluntarily retired from active politics, in order that he might devote all of his time to the development of the great coal lands that he and his brothers had accumulated. His next step was to build the West Virginia Central & Pittsburgh R.R. through Tucker, Barbour and Pocahontas Counties, connecting this road with the Baltimore & Ohio on the west and the Chesapeake & Ohio on the east or south. It was after the partial completion of this work that he and his son-in-law, the late Senator Stephen B. Elkins, founded the city of Elkins, W. Va., destined to become one of the state's leading municipalities. Senator Davis moved his home from Piedmont to Elkins, building a palatial mansion on a commanding hill on the outskirts of the town.

Having acquired the habit of railroad building, Senator Davis did not stop with the West Virginia Central, but built another railroad known as the Coal and Coke Ry., which he completed in 1906. He remained as its president and moving spirit until his death.

In 1904 the National Democratic party made Senator Davis its nominee for the vice-presidency of the United States, running on the ticket with Alton B. Parker. This final demonstration of the love and trust placed in Mr. Davis by the greatest men of his country came as an utter surprise to him, for the reason that he was not even present at the convention at the time of his nomination. Few lives of American men are more inspiring than that of Henry G. Davis. It is such careers as his that carry hope to the hearts of the humblest of American lads. May the coal industry have another "Grand Old Man," and it is our wish that whoever succeeds to the place held by Senator Davis in the minds and thoughts of coal-mining people shall be as deserving of respect and love as he was!

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Three Thousand Technical Men Indorsed Preparedness by passing the following resolution: The engineers assembled in public meeting in New York City on Mar. 20, 1916, under the auspices of the Engineers' Committee on Military Lectures believe that it is unworthy of a great nation like the United States and that it is dangerous to the peace, safety and liberty of its people to remain in our present position of inadequate military, naval and industrial preparedness. We believe that between pacifism and militarism there is a just, safe and proper ground greatly in advance of our present position—a ground which involves large additions to both the navy and army, a large increase in our schools for training officers and a coördination and mobilization of the physical and industrial resources of the nation. We believe that this nation should never make war except to enforce peace; that when strongly supported by armed resources its influence in maintaining its own liberties and rights and the liberties and rights of the weak and oppressed throughout the Americas will be greatly strengthened. We believe that Congress should give due weight to the opinion of experts and should then appropriate sufficient money to put the nation in a position of defense against attack on either the Atlantic or the Pacific Coast. We demand that our representatives in Congress act in accordance with this expression.



HENRY G. DAVIS
The "Grand Old Man" of the coal industry

and coal business. All of his savings had already been invested in timber and coal lands lying in proximity to the courses of Cheat River and its tributaries. These lands were bought for trifling sums from owners who did not realize their ultimate value. The prices paid by Mr. Davis varied from 50c. to \$1.50 an acre. The outbreak of the Civil War helped him materially in a financial way because of the many large army contracts

Department Meetings as One Means to Success

Does the company you work for ever hold any meetings of its superintendents, department heads, mine foremen, assistant foremen, firebosses, etc.? Do you have a chance to exchange ideas with and get new ideas from the other fellows who occupy positions similar to yours in the company? You say, No! Then your concern either willfully or ignorantly disregards one great factor of success in its operations that will inevitably mean a loss of many dollars, and you are not having the chance to succeed in your particular work to which you are rightly entitled.

Let me ask, What is the spirit of your organization anyway? Does each superintendent or foreman work all to himself, thinking only of his own little department, which may be at cross-purposes with some other department, and is he forgetful of the big thing—the success of his company? Such a condition, if it exists, can be overcome by adopting a plan of department meetings. This can be made still more comprehensive in nature by active committee work as a part of the plan.

I recently talked to a man who had spent several days at one of the biggest and most successful plants in the North. The man works for a concern in the South which is noted for the efficiency of its management and in which the policy of holding department meetings is closely followed. In the course of our conversation he said to me: "You know we have a fine lot of men, and our plan of holding department meetings has been productive of great enthusiasm, but I must say those fellows have it on us. Why, some of them are together at lunch or in committee meetings every day, and the spirit of that crowd is contagious. Anything good that is evolved by one department is sent right along the line. They all get the benefit of it. There are substantial prizes for good suggestions, and a bonus system helps greatly in keeping everyone on his toes. I don't believe for a moment that the company could have achieved the success it has without those meetings." My friend was right. Those meetings of the men who are making the wheels turn are a vital factor in the success of that concern. The biggest element in every concern is men—the men who dream and plan, the men who direct and the men who execute. They cannot be as successful when working as separate units as when they pull together in perfect teamwork. Now for

the cream of this matter. What will department meetings do for your concern, Mr. Owner or Mine Manager?

First, they will give your foremen a chance to get acquainted. It is as true on the job as it is out in the world that Jones doesn't like Smith just because he doesn't know him well enough. When your foreman at *A* mine asks for a new pump and you tell him that *B* mine has one that is not being used, he doesn't want it because he doesn't know the *B* foreman and doesn't want to use what he thinks has been discarded. You see he is only thinking of *A* mine's success. He forgets that a new pump will require a certain amount of the company's best and quickest asset, real money. But when these men get well acquainted in department meetings they will develop the spirit of company success and will put in service many an article now rusting at the plant.

Secondly, through these meetings your operations at all points will get the benefit of a good plan or method evolved by any one plant or department. Has the foreman of one mine worked out in practice a good plan of delivering empties and getting loads from rooms? Then you will get the benefit of this plan at all your mines. Has one foreman devised some particular safety device that is saving money at his plant? He will be glad to give all the rest the benefit of it, for a man likes to have his ability recognized.

Thirdly, a good spirit will be developed in your organization. Men are gregarious; they love to get together and "swap" ideas. They like to meet with the "boss," especially when he is showing them the way to the company's success. Don't mind serving lunch and having plenty of cigars at these meetings. We have been forcibly struck when we noted the cigar bills of some companies that are strong for department meetings. The size of the bills was rather astonishing, but not nearly so astonishing as the results achieved in developing a spirit of teamwork and healthy rivalry in the organization.

Let more and more coal-mining companies adopt the policy of department meetings in 1916. Don't confine them to mine operations only. Bring in your commissary manager, your auditor, your chief clerk, your timekeepers and storekeepers. You will find that all of these have ideas of value and can help as much as anyone else in making your concern a success. A man rarely thinks his best thoughts without the spur of company, and when he is describing a matter to someone else, the holes and weak places in his arguments show up more plainly to him than ever.

Success

- He has achieved success who has lived fully, laughed heartily and loved much;
- Who has acquired the confidence of children, the trust of women and the respect of men;
- Who has learned to appreciate the beauty in nature and the good in men;
- Who has made the world better than he found it, whether by the building of a factory, the painting of a picture or the expression of a noble thought;
- Who has done his work well, whether that work was to govern men or to govern his own soul;
- Who has kept an open mind and a civil tongue;
- Who has never passed hasty judgment on a man or a principle;
- Who has practiced charity, and has received largely, because he has given largely;
- Who has had sympathy for all and has learned something from babes and from sages;
- Who has had the courage to go where he would send a man; to do what would become a man;
- Whose life has brought out the best in others, morally and mentally;
- Whose censure is an inspiration, whose praise a benediction.

The Labor Situation

Anthracite Wage Conference

When the joint subcommittee of the anthracite operators and miners resumed its session at the Union League Club in New York City on Wednesday, Mar. 22, demand No. 9 was discussed. This demand calls for a readjustment of the scale now in force for machine mining.

The discussion was led by President White and District President Dempsey, the former explaining how the difficulties confronting the introduction of machine mining in the bituminous region were overcome. Mr. Dempsey, who is president of the Scranton district, in which machine mining has been introduced, argued for an equitable differential and asked that the committee decide upon a fair method for determining rates.

At the session held on the next day, Thursday, the matter of the miners continuing at work after Apr. 1, pending the result of the present negotiations, was taken up, and the following agreement was reached:

It is agreed by the representatives of the anthracite operators and mine workers as follows:

Section 1. That the terms and conditions of the agreement of May 20, 1912, be extended from Mar. 31, 1916, until such time as the negotiations now pending shall be completed or ended.

Section 2. That the anthracite mine workers continue at work during the period provided for in Section 1 hereof.

Section 3. That the terms and conditions of any agreement that may be negotiated during the period provided for in Section 1 hereof, upon the signing of such agreement by the respective parties, shall be retroactive to Apr. 1, 1916.

A letter was sent to each of the anthracite district officers notifying them that the agreement had been reached.

Miners Ask District Settlement of Disputes

The subcommitteemen then took up demand No. 10, in which the mine workers request that "the arrangement of detailed wage scales and the settlement of internal questions, both as regards prices and conditions, be referred to the representatives of operators and miners of each individual district to be adjusted on an equitable basis."

Conditions in the various fields were outlined by the miners, who argued that wherever unfair conditions exist they should be readjusted on an equitable basis. The miners are firm in their belief that if this demand is granted by the operators it will go a long way toward adjusting many of the wage and labor grievances existing in the hard-coal fields.

Not a word has come from the operators as to how far they will go in granting any of the demands of the miners, but it is almost certain that they will not recognize the United Mine Workers' Union and absolutely sure that they will not grant the 20-per cent. increase in wages demanded. One operator in speaking of this demand said that 20-per cent. increase in wages when added to the demand for an 8-hour day, also included in the program, would mean a 35-per cent. increase in earnings. The miners on the other hand contend it would mean a 31.1-per cent. increase.

The committees have before them for consideration 11 demands instead of 10, demand No. 1 having been divided into two, the term of contract being considered as one, and the making of individual agreements and contracts in the mining of coal being made the eleventh.

The entire session of Friday, Mar. 24, was given up to the consideration of demand No. 10, which was also under discussion on the previous day. The miners produced the official rate sheets of a number of collieries in the anthracite region and pointed out the parts of these which they considered inequitable. They urged that changing conditions in the mining regions had resulted in further inequities which need adjustment.

There was no session of the joint subcommittee held on Monday, Mar. 27, owing to the absence of W. L. Connell and W. J. Richards, two of the operators' representatives.

The miners concluded the presentation of their demands at the morning session of Mar. 28, International President White and District Presidents Dempsey, Kennedy and Matthews all addressing the conference. The principal talk, however, was made by White, who spoke for an hour and a half. In his summing up he devoted most of his time to discussing what he termed the three cardinal demands—the 8-hr. day, recognition of the union and the wage question.

Miners Say Day's Work Can Be Done in 8-Hr.

Taking up the demand for an 8-hr. day, President White urged that the mine workers could produce and prepare as much coal in eight as they do now in nine hours. He emphasized the fact that there was much lost motion at present and that the work in the mines was not done as efficiently as it might be. This would be eliminated if the 8-hr. day was granted the mine workers. He cited as an example conditions in the bituminous fields where he said the miners were producing as much coal in eight hours as they formerly did in nine. Continuing, President White said that mines operating 9 hr. in the nonunion districts, employing the same number of men and machines as those in the unionized fields, do not produce any more coal.

It may be stated here that in the anthracite region are many miners who doubt whether their earnings will not be reduced by the granting of the 8-hr. day to the mine workers who wait on their needs with cars, locomotives, mules and dumps. They are afraid that a scale which affirms the 8-hr. day for all men will injure their interests. The miners and their laborers have never worked a full 8 hr., and their working time will not be affected. They naturally hesitate to agitate against others obtaining a condition which they themselves have long enjoyed, even though they realize that its effect on their own interests is open to question.

On the demand for recognition of the union White said it was an economic necessity and that its adoption in its fullest terms would prove beneficial to operators, miners and the merchants of the region. Local strikes, he said, would be entirely eliminated if the union is given full power to govern its members and if that power is recognized by the operators. But such full power involves not merely accepting the union, collecting the checkoff, or even creating a closed shop. Full power is not attained till unions can and will collect fines from their members by operation of the law, or imprison them for nonpayment. It is absurd to say even at a closed-shop mine that the union now has the power to make the men work when they are desirous of going on strike in contravention of their solemn agreements.

The increased cost of living was cited by President White as one of the reasons for an increase in wages and he presented a mass of statistics to support his arguments. The question of inequalities he said must be settled within the districts affected, because any basic-scale arrangement for the adjustment of such disputes would always be unsatisfactory. In support of his contention White said that the miners in the bituminous field had long profited by an arrangement of this kind.

Operators Ask Miners To Guarantee Output

The operators' representatives followed, giving a general outline of the situation as they view it. S. D. Warriner led the argument, which was brief, devoting his remarks to the matter of recognition. Short talks were given by the other operators' representatives, Messrs. Connell, Richards and Williams, which were principally devoted to a discussion of the demand for an 8-hr. day. Some reference was made to the wage increase. Regarding the first, the operators said they desired some assurance that the mine workers could produce as much coal in 8 hr. as they now do in 9 hr. This latter proposition is said to be the vital point of discussion. The hope was expressed by the operators' representatives that the committee would be able to reach some constructive solution of the matters under discussion.

Another communication was received by the joint subcommittee from the Wilkes-Barre Chamber of Commerce, requesting that the contract be made for a period longer than two years. The secretary was instructed to draft a reply and submit it to the committee for action.

On Wednesday, Mar. 29, a compromise offer was expected from the operators' representatives, but it was not forthcoming. The operators presented rate schedules, mostly of independent operators, to prove that inequalities in wages did not exist. The operators said that many of the low rates against which the miners' representatives had argued in presenting their demands were obsolete and no longer in use. On Apr. 1 the anthracite miners celebrate the institution of the 8-hr. day in the bituminous regions, and the international officials will probably be present and an early adjournment for that purpose is expected.

Philadelphia Joint Conference

On Monday, Mar. 20, the operators and miners in central Pennsylvania, a bituminous district, met in Philadelphia to arrange for a new contract to replace that which expires on Mar. 31. So far nothing seems to have been accomplished.

There were 18 demands to be considered. The miners' representatives were James Purcell, of Wellsboro, district president; Charles O'Neill, of Clearfield, district vice-president; Richard Gilbert, of Clearfield, district secretary and treasurer, and an executive committee of ten members, headed by F. E. Waite, the president of the Dubois subdistrict.

About 30 operators' representatives were present. B. M. Clark, of Punxsutawney, attorney for the Buffalo, Rochester & Pittsburgh Coal and Iron Co. and president of the operators' association, John C. Forsythe, of Clearfield, secretary, and Henry Boulton, vice-president respectively, of the association, were the leaders of the operators.

Incorrect Basing Rate Complicates Matters

The first two demands were considered at the first session, but the operators could not see their way to accept them because the recognition of the union was interpreted by the miners to mean the closed shop and because the second demand was not as innocuous as represented. The increase called for was 3c., and as that was the rise in the central competitive district it looked fair enough, but the base rate was set at 50c. a ton, which the operators claim is much more than many of them are paying at present. For most of them 47.12c. was the rate paid, and the base rate was therefore 2.88c. higher than their present rate, and the proposed rate would be 5.88c. higher yet.

On the following day the operators refused to grant the next three demands. They stated that the minimum wage scale for men was 33c.; adding 5 per cent., the rate would be 34.65c., and not 37.27 to 40c. as specified. Of course trapping work being done by boys can hardly be figured in as constituting a real minimum day wage. The miners offered to sign up with the operators for the interstate scale, but the operators declared that conditions in central Pennsylvania would not permit them to accept it.

Demands Receive Somewhat Speedy Rejection

On Mar. 22 the operators refused to make the 8-hr. day figure "from bank to bank," resisted the demand for weekly paydays and declared themselves against the delivery of cars by the operator at the working face and their removal therefrom at his expense.

On Mar. 23 demand No. 9 was reconsidered after its tabling on the previous day. This provides for a 5-per cent. increase in all dead work and yardage and that no men shall receive less than 37.27c. per hr. (that is, \$2.98 per day) when paid by the hour. This was refused. The maintenance of old differentials in tonnage and yardage as in the contract of 1914 was denied, as also was the discontinuance of the use of coal-cutting machines in pillars and stumps and payment for all narrowwork.

On Mar. 24 demands Nos. 14 and 15 were presented and refused. The first requires all local inequalities to be referred to the local union for adjustment, and the second gives the checkweighman and district executive board the right to test scales. The delegates representing the miners then desired to present the other three demands together, but the operators wanted them discussed separately.

It is not likely that the operators will, in the end, reject all the demands in their entirety. They are doubtless willing to modify their contract as much as and no more than the interstate contract was modified, and they are correct in their attitude. The miners apparently in their explanatory note have not been quite aboveboard with the public, but they cannot disguise the inwardness of things to men who know the scale they are paying and have paid.

Scales, too, are tricky things, none too well written at the best, and they need the living voice to make them clear and some clever man to rewrite them. Unfortunately some of the best masters of technical English use their powers only to insert "jokers" and render the obvious uncertain. In view of these things the operators do well to insist on a clear declaration from the miners' officials as to the meaning of every sentence and every clause. And as future peace depends on that knowledge, inconsiderate haste now would be inadvisable.

Moreover, the operators are feeling out the true attitude of the men. Differences often exist between them and the demands do not always represent the mature and unanimous judgment of those who too often unthinkingly advocate them.

It is questionable even now whether the international officers do not regret their insistence on the run-of-mine scale, the acceptance of which has been delayed in some sections by the reluctance of the miners more than by the opposition of the operators.

Indiana Miners' Convention

The annual convention of District No. 11 of the United Mine Workers of America, comprising the so-called "bituminous" coal miners of the State of Indiana and excluding the workers in the "block" coal mines, met at Evansville, Ind., on Mar. 21.

The miners showed strong opposition to the action of their international officers at New York City, and though the convention decided not to try as a body to interfere with the referendum, it protested against "the usurpation of authority of the international officials" in signing the contract on behalf of the Indiana district representatives.

The great victory does not look well to many of the Indiana coal miners. The miners in the southern part of the district are on a mine-run basis, and as the wage rate has increased they are benefited; but the miners of the northern part are paid on a screen basis, and as a result of the change they figure they will lose by the new scale and they are wrathful. Just as in parts of western Pennsylvania there is a certainty that the change will bring nothing but a lowering of wage, so in Indiana the same assurance prevails, and it is anything but a source of gratification to the miner.

Evansville Entertains 200 Miners' Delegates

Evansville entertained the convention for the first time. Terre Haute used to be the regular place of meeting. Two years ago Linton succeeded in securing it, but this time Evansville was favored.

After Edward Stewart, of Terre Haute, had called the meeting to order the miners were welcomed by William E. Tieman, president of the local Central Labor Union, on behalf of the labor organizations of the city, and by Benjamin Bosse, mayor of Evansville, on behalf of the citizens. Father O'Hara, the Rev. Mortimer P. Griffin and A. J. Pogue, chairman of the local committee on arrangements, addressed the assembly.

At the end of the last fiscal year, November, 1915, there were 19,213½ paid-up members in the Indiana "bituminous" district, and 20,083½ members including those in arrears. It is estimated now that there are 22,000 members, and they were represented by some 200 delegates.

Some Delegates Threaten Break in the Union

To Vice-President Hayes and Secretary-Treasurer Green of the international organization was left the task of endeavoring to have the miners favor the recent contract. It was no easy matter. There were some men who threatened that the miners would withdraw from the international body if the interstate contract should be forced on them by a referendum of all those affected.

The opposition does not consist merely of insignificant men. Edward Stewart, the president of the district, and William Mitch, the secretary, both of Terre Haute, are opposed to the scale which has been signed, though the attitude of the former became more favorable to a compromise day by day.

Hayes was almost apologetic. He called on the miners to accept the contract because it ended a 40-year struggle and would benefit the interstate area as a whole by removing the differences in computing tonnage. Hayes told the Indiana miners they could not afford to strike alone and give the Ohio and Illinois operators a chance to take their markets.

Indiana Men Long Opposed to Mine-Run Weight

W. C. Morgan, of Terre Haute, said that he had opposed the mine-run system of payment for 42 years, and District President Stewart declared that he had notified the international officers that the Indiana miners, who had the double standard, did not want to be deprived of the right to the screen basis of measurement.

Stewart declared, "I do not want to say that the international officials had no interest in Indiana, but I do believe that they had more interest elsewhere." As a matter of fact the run-of-mine method of weighing is largely an obsession with the international officers. Green has in a way immortalized himself with his antiscreen bill and by the establishment of run-of-mine weighing in Ohio. But in his zeal for its enforcement he has insisted on its being made operative where the miners are distinctly hostile to it and where they stand to lose by its introduction. The leaders seem to view the interstate area through an Ohio eyepiece.

Stewart and Mitch made a strong protest against the United Mine Workers "Journal," censuring it for saying that they both had been in favor of the agreement as it stood. The statement was declared to be untrue and made solely to mislead the miners.

Smith Urges Separate Agreement for Indiana

Nolan Smith, of Clinton, offered the following resolution: Resolved, that we demand an apology from our international president and that he must render to us the same honorable service that we have always had in the past with-

out any reflection or deviation, and be it further resolved that we refrain from sending ballots to the various locals to vote for or against the acceptance or rejection of said scale, and be it further resolved that this district No. 11 negotiate its own scale and agreement to be dated Apr. 1, 1916, and to continue for two years.

On Friday, Mar. 24, more conservative counsels prevailed, and a resolution was passed by 57 to 42 to the effect that the interstate wage scale signed in New York City should be submitted to a referendum of the locals without interference of the district, but having thus conceded the meat of the international leaders' contention, the delegates protested in the resolution against their "usurpation of authority."

Must the Coal Face Be "Snubbed" in Indiana?

In the morning of the same day the convention sent a telegram to President White desiring an interpretation of clause 7 of the New York agreement on the preparation of coal and penalties. The miners wanted to know if the international officials would sustain them in their position if they refused to accept any change in their present status. Mr. White replied:

Specific terms of the New York agreement must govern. Any clause on preparation of coal must be mutually agreed to by operators and miners. All details must be worked out locally. International officials on ground have full authority to speak for the international organization.

Clause No. 7 in the New York agreement says that "all district organizations herein represented shall take up the question of preparation of coal and adopt such rules and regulations with proper penalties as will best suit the conditions of each district herein represented."

Stewart reported that Philip Penna, who represented the Indiana operators, had discussed this matter with White and had secured from him an understanding that this clause should be held to mean that the Indiana miners would undertake to maintain like working conditions to those in Pennsylvania and Ohio. The miners in Indiana, according to this, would have to agree to "snub" their coal, and this would much decrease their earning power. The miners are afraid that uniformity may be pressed even farther and that they may lose their weekly payday.

The shotfirers' bill and the garnishee bill were advocated by H. C. Hughes, of Ayrshire, legislative representative of the miners of the district. The miners want the washhouse act obeyed, now it has been proved constitutional.

Officers Refuse to Hide Behind Skirts

When on Mar. 23 Edgar Wallace, of Indianapolis, the editor of the United Mine Workers "Journal," announced that Mother Jones would arrive on the following day, the declaration was made that the international officers and the scale committee were trying to hide behind a woman's skirts. So it was decided that Mother Jones should not speak, and it was announced that she came only to see Hayes and Green about the differences between the union and the seceders in West Virginia. She left without addressing the convention.

The miners exhibited by their fear of Mother Jones that they realized to the full what an asset that person has been to them in their recent troubles. She has many times sheltered the union beneath the folds of her ample skirts and has often with benignity covered over some transactions which could only be described as shady.

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Miners' Convention in Ohio

On Tuesday, Mar. 21, the eighteenth annual convention of the eastern Ohio miners composing subdistrict No. 5 met at Bellaire, Ohio, and discussed the newly signed interstate bituminous agreement, not viewing it, however, with much favor. About 150 delegates were present, representing approximately 14,000 mine workers in the eastern Ohio field.

President C. J. Albasin, it will be remembered, refused to sign the scale, and his address made clear the objection which he made to its acceptance. He said in part:

You are well aware that a tentative agreement was reached between operators and miners in New York City, Mar. 9, 1916. This is an interstate agreement. It was made for the coalfields of Ohio, western Pennsylvania, Indiana and Illinois, and it is subject to ratification by a referendum vote of the members of the organization in all the bituminous fields [affected].

Rejects the Greatest Victory of the Union

This contract was adopted at the New York conference. As your representative I felt it my duty to oppose it, and I believed that in so doing I expressed your sentiments. We all realize that the completing of this contract is a great victory for the organization as a whole, for it makes payment for coal on a mine-run basis universal in the bituminous-coal fields of the country and it practically establishes a uniform price for mining throughout the competitive field. It does this by raising the price of mining in certain fields where the price is low to the higher price ruling in other fields. Furthermore, it carries an advance over the last contract of more than

6 per cent. in the mining rate and provides a 5-per cent. increase for day labor. It is perhaps the greatest victory that has ever been gained by our organization.

Except for one clause we might well give vent to unqualified joy in accepting this contract. I mean clause No. 6. It was because of its presence in the contract that I felt constrained to go on record against it. It seemed to me that it left us no means of escape from certain unbearable conditions which we were forced to accept at the last settlement. We then faced hardships and almost destitution after a bitter struggle of 14 months. The financial condition of the organization was deplorable, and consequently certain rules were admitted in our contract that would otherwise have been excluded. The New York agreement, indeed, gives us the privilege of taking up internal conditions with the operators. This we shall do, but you will decide what shall be the nature of our struggle.

Clause 6, to Which Eastern Ohio Miners Object

By reference to the issue of "Coal Age," Mar. 25, 1916, p. 542, it will be seen that Clause No. 6 provides:

All internal differences are hereby referred to the various districts for settlement, with the understanding that only by mutual consent shall anything be done in subdistrict, district or wage-scale conventions that will increase the cost of production or decrease the earning capacity of the men. All rules now incorporated in existing contracts shall remain in force unless changed by agreement between operators and miners' representatives.

Albasin urged that the miners support a number of changes in the workmen's compensation act, particularly in regard to increased awards to the families of victims in the case of death. He recommended a law to compel state institutions to buy Ohio coal, another to correct present freight rates and a third "to compel all mine foremen and firebosses to pass a practical examination given by a board of practical mine workers." He spoke favorably of the scheme to erect a labor temple in Belmont, which the miners might make a subdistrict headquarters and for which \$10,000 was already available.

Vice-President William Roy's speech was largely political, condemning Representatives Hays and Hodgin and Senators Moore and Howard for their vote in favor of the Gallagher amendment of the Green antiscreen bill.

Helped Over Difficulties; Would Now Build

The secretary-treasurer, William Applegarth, reported that the total receipts for the preceding fiscal year ending Feb. 29, 1916, were \$54,531.98, and the expenditures were \$41,791.41, leaving a cash balance of \$12,740.57. Six local unions had been organized during the fiscal year and eight were abandoned, leaving 84 local unions, with a membership of 13,626 members. The total amount received for the donation fund, which was established for the relief of the men and their families, was \$13,029.74. Of this, \$13,005.30 was expended from July onward, leaving \$24.44 in the fund.

The committee on officials' reports approved the action of Albasin in leaving the New York conference and recommended that the convention sustain him in that action. They also approved of the suggestion that 5c. per week per man be assessed to furnish a fund to purchase a site and erect a sub-district headquarters along the Ohio River front. They approved the movements to secure a miners' hospital and to open co-operative stores, and they indorsed Vice-President Roy's stand against compulsory arbitration.

The eastern Ohio miners show themselves in a bad light. Helped over all their difficulties by miners east and west, they have barely attained a surplus when they want to build a labor temple instead of trying to pay back the generous contributions of others or to build up a reserve so that they can carry along others as they have themselves been carried in their difficulties. They are not yet convinced that their wages are all the operators can pay, and they are among the few mine workers to protest against what is known as the "Columbus clause" in the contract. It is hard to express with sufficient force the fatuity of their present stand.

At Peoria, where the Illinois miners are holding their convention, a similar objection has arisen to the restriction of liberty in making local readjustments, and the difficulties suggest a reason why the miners may in the future break away from an interstate contract which either prohibits all elasticity in accommodating local needs or else makes the protocol a mere outline of an agreement with every possibility of clashes later in arranging local conditions.

The conference tried to finish with exemplary speed. At the suggestion of the committee on rules and orders no one was allowed to speak more than once or for more than five minutes on any subject. But on Saturday night, Mar. 25, the meeting was not concluded, and was adjourned till Monday. The scale committee, of which the eighth and last member was named on Mar. 24, had not yet formulated its program.

The annual convention of the United Mine Workers in the Hocking Valley subdistricts will meet at Logan, Apr. 5. A joint convention of miners and operators will be held immediately after the adjournment of the miners' meeting for the purpose of conferring upon the details of the agreement.

"Block" Coal Convention

When the international auditors made their report at the Indianapolis convention they declared that the "block" coal district of Indiana, No. 8, had 767 paid members, 179½ members exonerated—more than the Seventh District of Pennsylvania by the way—and a total roll of 946½ members.

There are smaller districts, it is true—Local Union 828, of Indianapolis, with 24, Alabama with 32, Nova Scotia with 37, No. 29 West Virginia with 342, Vancouver with 344 and Tennessee with 632. These figures are inclusive of all members, paid and exonerated. Colorado had only 520 paid members and so had less than the Indiana "block" district.

Miners Have 10c. Differential, but No Work

This small district held its exclusive convention at Brazil, Ind., beginning Mar. 23. The delegates are strongly opposed to making any concessions to the operators. There is a 10c. differential between the "block" and "bituminous" coals despite their contiguity, the "block" coal scale being the higher. The mines work irregularly because of this differential. The operators claim that a reduction of 10c. would give the "block" coal miners steady work, but when at a joint meeting in January a concession was suggested, the miners remained solidly by their differential.

The "block" coal miners managed to get the union to consent to their retaining a screened-coal basis of measurement, and strange to say they have arranged in the scale not only for the retention of this privilege, which is right, but also for an increase of 5c. per ton on pick-mined coal and 4c. for machine-mined. It is clear that idleness, evidenced forcibly by the 19 per cent. of exonerations, has taught these willful "block" miners no lesson.

Plight of "Block" Miners Sadder Than Ever

According to some reports the Northern Indiana bituminous scale will be lower than ever owing to the introduction of the mine-run basis. The "block" coal miners, nevertheless, are ready to arrange for an increase higher by 2c. and 1c. than the "bituminous" coal miners. How they expect to succeed no one knows. They would do well to imitate the Belleville, Ill., miners who want a reduction in wage. When one learns of the attitude of the "block" coal miners he is forced to wonder if the word "block" is an attribute of the coal or of the worthies that dig it.

The miners believe that as the operators have provided for no referendum to check the decisions and signatures of their scale committee, they cannot now seek a readjustment of the signed contract even though the miners are in no way bound to accept it.

Probably the operators' scale committee in certain sections was not really representative of the operators and some of the mine owners may not feel bound by its action. In the "block" coal district, however, small as it is, one man, William M. Zeller, has signed the protocol.



Interstate Contract Opposed

The interstate contract between bituminous operators and miners has been criticized in other places than Ohio and Indiana. In western Pennsylvania there are miners who believe it will reduce their wages. The upper Monongahela Valley around Charleroi, Penn., does not favor the contract. The territory south of Monongahela between that city and Brownsville favors the old method of measurement, believing the new scale is based on the supposition that more slack will be made than the miners are now making. The miners in this region will probably vote against a confirmation of the agreement when the protocol is submitted to a referendum.

Belleville Miners May Ask for 4c. Decrease

In the Belleville district of Illinois, which is close to St. Louis, the miners and operators are said to be desirous of arranging a lower scale than is provided in the contract. They would like to see the rate of mining reduced 4c. per ton. According to E. S. Phaler, Superintendent of the Southern Coal, Coke and Mining Co., the Belleville operators, who have to pay 64c. per ton, cannot compete with the southern Illinois operators, who only pay 60c. a ton. As a result, the production in the Belleville district has dwindled, while the output of southern Illinois has increased.

The disadvantage of idleness outweighs any profit which the Belleville miners may obtain from the higher scale. There is no chance of equalizing the wages now by increasing the pay of the southern Illinois miners, and an effort is to be made to have the Peoria convention authorize this reduction. Mr. Phaler has prepared a statement showing the gradual diminution of the output in St. Clair and Madison

Counties, constituting the Belleville district, and exhibiting the steady increase in the production of Perry, Franklin and Williamson Counties, which constitute the southern Illinois group.

From July, 1910, to July, 1911, the Belleville district output was 8,889,861 tons and that of the southern Illinois 8,981,887 tons. From July, 1914, to July, 1915, the output of the Belleville district was 6,305,038 tons and the production of southern Illinois 16,658,558 tons.

Central Illinois Mine Owners Discouraged

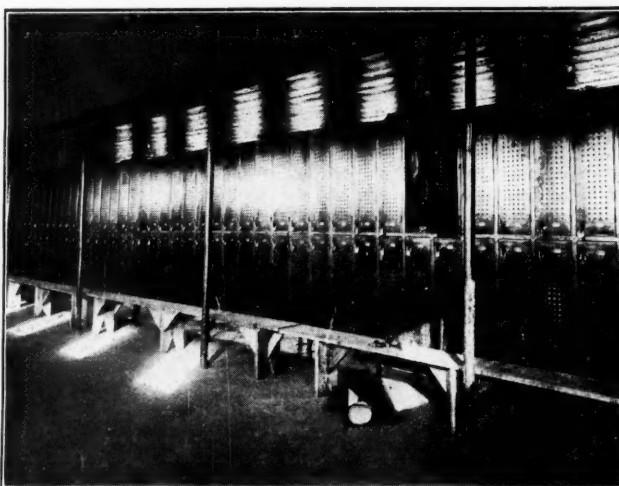
The high wage scale is operative all over central Illinois and not only in the Belleville district, and the new scale which continues these former conditions has made the operators lose heart. Their difficulties are reaching a climax, the low scale not being the only trouble. The coal is not so thick and desirable in many places as is that of southern Illinois. The operators in the latter district are hard put to it to avoid bankruptcy, and the condition in central Illinois is even more grievous.

Many mines in the latter district are being closed with the announcement that they will be idle for two months. The expectation is that most of them will not work all summer. A number of the Peabody Coal Co.'s mines in Sangamon County will be closed Apr. 1, and it is expected that most if not all of them will be idle later. William Jess, agent for the Peabody interests in Springfield, recently organized into the Springfield District Coal Mining Co., announces that the Cora mine, at Andrew, and the Peabody mine, at Stonington, would close Apr. 1 and that conditions might develop at any time that would cause a cessation of business at all the mines. The Woodside mine is closed, and the company's mine at Pawnee was recently sealed. The new Taylorville mine has been closed for several weeks, and the old Taylorville mine is expected to suspend shortly. The Devereaux mine, of the Chicago-Springfield Coal Co., and the Jones & Adams mine, east of Springfield, will close Apr. 1. The Jefferson Coal Co.'s mine, south of Springfield, has not been working for some time.



Lockers for Washhouses

The accompanying illustration shows a style of steel locker for clothes, particularly well adapted for washhouses at coal mines. These lockers are installed at a mine belonging to the Security Coal Mines Co., DuQuoin, Ill.



STEEL CLOTHES LOCKERS INSTALLED AT MINES OF THE SECURITY COAL CO., DUQUOIN, ILL.

One of the features of this design is free circulation of air, which condition is most essential for satisfactory service at mines. The lockers are substantial and afford absolute safety for the things contained in them. They are much more sanitary than wooden lockers and of course have the additional advantage of being fireproof. These durable coal-mine washhouse lockers were constructed by the Berger Manufacturing Co., of Canton, Ohio.

Editorials

In this world the only luck that ever helped a man is the luck of rising early, working hard and maintaining honor.

■

No one can row against the stream all his life and make a success of it. It is fundamental that there must be accord between a man and his work.

■

The idea that success depends upon beating somebody is wrong. The permanent advances of humanity have come from coöperation more than competition. Sensible work never hurt anybody, but rivalry embitters and kills.

■

The University as a Successful Character Builder

The average mine manager if asked what is "college-made character" would either say that "there ain't no such animal" or that the organism it described mightily resembled a bookworm, the sole object of which seemed to be to bore deeper and deeper into books.

Now as stated in an editorial entitled "Ideals for College-Made Men," Mar. 11, 1916, the Carnegie Foundation for the Advancement of Teaching is trying to find out the right ideals for colleges to advance by asking the members of the engineering profession what are the characteristics in men which they most value. At a recent meeting of the American Society of Civil Engineers, Professor Mann reported progress in the investigation and stated that as a result of the replies sent in by several thousand engineers it was ascertained that knowledge of the fundamentals of engineering science had only a rating of 13 per cent.

Conceivably, it may be true that character is the important qualification for men in authority in engineering enterprises, but it does not follow that colleges are the right places to inculcate such character or that they can with advantage undertake such work. Thus bread is an indispensable factor in life and banks are great public institutions having to do with all human activities, but it does not follow that bread shall be made in the deposit vault or distributed through the cashier's window. And still less are we justified in believing that the teller, who can add a long column of figures correctly, is therefore well qualified to mix dough.

If character is to be described as initiative, integrity, responsibility and resourcefulness, then there are few colleges in this country which have it as an important by-product, though one element of character, integrity, is aided by college training. Probably in many universities it is true that character as thus defined and considered as a whole is destroyed rather than created.

In England there are two universities and several schools which are believed to give character. The students, who until entering have been privately trained, live in these communities a somewhat unregulated existence,

and their minds are allowed to react on one another. The young man enters into a large community life and learns to adapt himself to it and so obtains a forceful character, but not always one which shows responsibility or resource.

Send the same student to a college where he will undergo a heavy grind, and he will tend to lose responsibility, resourcefulness and initiative. In order to rule out misfits, for which the faculty would be blamed, the university will arrange his curriculum and will direct his studies. Thus at the very outset the student is relieved of the necessity of decision.

Then he buries his nose in books and learns to rely on them. Every volume he reads has been closely scanned by a critical faculty, and he is taught to believe in it as infallible. Indeed it is often absolutely above cavil, but even so the quality of discernment of the student is lulled, and his tendency to sit in judgment on all matters ebbs slowly away. He tries to think in accord with his instructors rather than to be led by his own reflections. His gullibility and simplicity are thereby increased, though of course he will obstinately refuse to believe what the books assert is not true.

If there is a brilliant man in the faculty, the student learns to look up to him, but in this he is imitative, and so he is weak. Men can only be made forceful by exercising discernment, by doing things, by taking large responsibilities and by making decisions. Some undertake such matters at college, though the time they have for them is limited. Such men usually had all the character they needed before they came to college, and it is not able to rob them of it or of the critical faculty they brought with them.

It is the working and not the preparatory life which builds character. No college teaching will make a man out of the chicken-hearted fellow who worries about a small debt or mortgage, who is afraid to open a telegram, who, fearing that a letter has something unpleasant in it, lays it on one side, who puts off all unwelcome tasks, who looks at life with a squint or who instinctively dreads a big burly fellow, a man of the world or an official in uniform.

Some men would rather have someone else open their letters and tell them the contents than face the full burden of complaint borne on the unwelcome lines. Some dread interviews because they fear the contempt of others. Some fear to make friends lest they may later offend them, and the thought of failing in a new job makes them seek it praying all the while that they may not be successful in obtaining it. When they are given a recommendation by a friend, they wonder how ever they will be able to comply with its terms. Praise appalls; blame overwhelms them. And at times the very thought of false steps taken years ago sets cold chills running down their spines, so that they speak out loud in their mental embarrassment.

At such a moment a surveyor will forget his plummet or his notebook and the engineer-in-chief perhaps some-

thing far more important. Thus this stupid preoccupation in trifles which do not matter brings other oversights, which cause further preoccupation and new oversights. The chain of circumstances is continuous. Wishing to succeed is sometimes so carefully implanted that all that can grow in the field is wishes, regrets, sensitiveness, worries and what not, so that success cannot rear even a tiny spike of blossoms.

Such men, no matter how efficient they may be or how much they may be valued, avoid taking a vacation or even a business trip lest in their absence some mismanagement may be revealed or some misrepresentation made. They fear that when they return they may find the word for their supplanting has already gone forth.

What is there for such a man but experience large and full? And perhaps after all it will only wreck him. Much depends on the man. An acid turns litmus red, an alkali blue, some turn an experience to their upbuilding where another would be headed by it to destruction. Experience is the only cure—teaching is positively an irritant and aids rather than cures the affliction; but the disease may be almost beyond the power of arrest.

Yet the man, regardless of his enfeebled will, may be sane enough and strong-minded enough, even pugnacious over some matters, and he will scrupulously hide these signs of his weakness. He has abundance of character of a sort, often of the best sort, though it is not such as aids him in governing others. He may be an admirable fellow in every other way.

Schools may teach facts, may develop thought, may even build up the ethical qualities in man, but the mental qualities of character grow best under adverse conditions, which foster self-dependence. They prosper most when least tended, and they cannot be a natural product of the schools because college professors are only rarely found to be possessed of them.

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Favorable Business Outlook

Prosperity in the coal industry, which means acceleration and plenty in all branches, is so entirely dependent on general industrial activity that an analysis of current conditions presents an interesting study. The situation at present has seldom been more favorable. The latest statistics show a significant expansion of the coal consumption that bespeaks a highly encouraging speeding up of operations in all lines.

The tonnage statement of the Pennsylvania R.R., by far the leading coal carrier in the country, shows a moderate increase for the total year 1915 of something over 2½ million tons. For the first two months of the current year the growth shows a spectacular increase of 3,335,160 tons, the total being 12,945,792 tons.

The statement of the Norfolk & Western Ry. for the same period, though involving a smaller tonnage, shows an even more unprecedented increase, the total for the two months of this year being 5,608,525 tons as compared with 3,646,759 tons in 1915. The figures for the year 1915 indicate a substantial increase over the preceding twelve months, 30,931,234 tons being handled in 1915 as compared with 26,490,580 tons the preceding year.

That the hard coalers are also participating in the boom is evident by a gain of 2½ million tons during January and February, as compared with the same months

last year, the total for the period of 1916 being 11,580,-656 tons. With all indications pointing to record-breaking shipments for the month of March, there is no doubt that this difference will be substantially increased when these figures are available.

The Baltimore & Ohio R.R. during the half-dozen months ending with and including January was outstripping her record for the year before at the rate of half a million tons a month, the current statements showing a movement of from 3 to 3½ million tons per month as compared with an average of about 2½ million tons for the previous period.

The Chesapeake & Ohio Ry. for the seven months ending with and including January of this year increased her tonnage 2½ million tons as compared with the preceding period, the respective figures being 15,114,286 tons in 1916 and 12,690,957 tons in 1915.

Even with the heavy decline in our exports to Canada, the foreign movement has satisfactorily recovered and shows a gain for the year 1915 of 2½ million tons as compared with 1914, the respective figures being 20,305,-254 tons in 1915 against 17,632,094 tons in 1914.

The Middle Western carriers have apparently responded to the improvement somewhat slower, the year of 1915 showing a movement of 45,670,562 tons on the 17 principal roads as compared with 43,773,755 tons in 1914. However, the monthly statements for December indicate an increase at the rate of over half a million tons per month, the movement for that month in 1915 being 5,-440,040 tons, as compared with 4,775,869 tons for the same month last year.

One of the most significant increases is that exhibited in the performance of the 13 leading carriers for the five months ending November, the total for that period in 1915 being 117,206,846 tons as compared with 99,507,374 tons in the preceding year. The November figures for these carriers indicate that they are beating their monthly records for 1914 at the rate of nearly 7 million tons per month.

A glance at the annual reports of the leading coal producers throws further light of an encouraging nature on this subject. The United States Steel Corporation, for instance, in 1915 mined 20,800,204 tons of coking coal, as compared with 15,890,382 tons in 1914. In the annual report of the Pittsburgh Coal Co. for last year the following significant comments are found:

"Demand gradually increased during the last half of the year, and the year ended with a short supply due to improved general demand. Our products went to Sweden, Italy, Argentina and Brazil, but shipments were limited by lack of vessels and high cost of transportation. It is believed, however, that a permanent foreign market has been secured for it on its quality. Canadian commercial conditions continue to show the disastrous effect of the war on all lines of business, but are now improving."

"The outlook is encouraging for both tonnage and prices. For the past eight years none has been a good year throughout. For 1916 there are good grounds for expecting a larger tonnage and materially better prices than for 1915; also a good gain in net profits."

President Truesdale, of the Delaware, Lackawanna & Western, says in his annual report for 1915: "Without doubt so long as the European War continues, the demands upon this country will result in a continuance of the existing high tide of business and general prosperity."

Sociological Department

A Successful Centralization of Township Schools

BY C. E. OWEN*

SYNOPSIS—Description of a modern fireproof building which replaces a number of one-room schools scattered through the Adkin district of McDowell County, West Virginia. Its construction makes it possible to give an excellent and well-graded education to all the children of the district.

About three years ago the Board of Education of the Adkin district of McDowell County, West Virginia, in which are located the mines of the United States Coal and Coke Co., decided to make some better provision for

be properly provided. The district superintendent who controlled the schools could not give them the care which he desired.

It was decided therefore to collect the pupils in specially constructed wagons or hacks and take them to a central or consolidation school to be constructed just south of Gary. The children within a radius of a mile and a half walk to the school, but those who live at a greater distance, some as much as four miles, are conveyed in wagons, such as can be seen in the illustration. Little difficulty has been experienced in the transportation part of the program, although at first the roads were not very good. They are getting better, however, every year. The locations of the small schools and of the large institution which supplants them are shown on the map.

As soon as the preliminaries were settled and the necessary funds were forthcoming, plans were made and



PUPILS BROUGHT TO SCHOOL IN COVERED WAGONS



SCHOOL, SHOWING EXCAVATION AND RETAINING WALL

the school needs of the children. The population was rapidly increasing, and the buildings were inadequate to house all the pupils who would soon be seeking for admission.

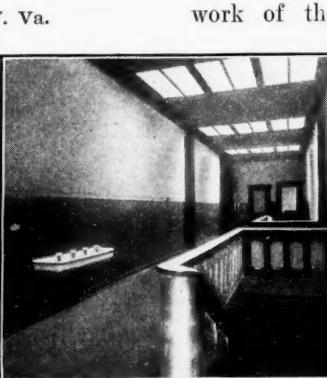
The schools that had hitherto served the community were small one-room buildings, each little mining village having one for white pupils and one for colored. With this arrangement, though schools were numerous and handy to the children's homes, they could not be properly supervised nor could the material needs of the children

work begun on the preparation of the site for the building. The roughness of the country made it necessary to make a large excavation and build extensive retaining walls before a level area of sufficient size for a building and playground could be obtained. A retaining wall was built along the creek to protect the playground and increase the area.

The foundation of the school consists of a heavy rubble concrete base under the outer walls. All the interior columns rest on concrete footings. The entire framework of the building is of reinforced concrete, the



AUDITORIUM ON FIRST FLOOR



STAIRWAY AND FOUNTAIN



CLASSROOM, SHOWING SKYLIGHT

*Architect, 1038 Third Ave., Huntington, W. Va.



FOOT OF THE REINFORCED-CONCRETE STAIRWAY

CLASSROOM, WITH SOFT, EVEN LIGHT FROM ABOVE

outside walls not carrying anything but their own weight. The roof and second floor are constructed of reinforced concrete and hollow tile, an excellent form of fireproof construction.

The outside walls are of dark red rough-texture brick and hollow-tile "bakup" blocks. The trimming is of Ohio sandstone, except the cornice and entrances, which are of solid concrete and were molded in sections at the building site and placed in position as they were needed.

The second-story ceiling is constructed of ribbed wire lath and plaster and is suspended from the roof and has openings for ceiling lights under those in the roof, which in their turn are covered by skylights. The partitions throughout the building are of 3-in. plaster blocks. The heater space, however, is surrounded by a 9-in. brick wall. The height from floor to ceiling on the first story is 14 ft., and the same dimension on the second floor is 12 ft.

The stairway is of monolithic reinforced concrete and rests on a brick foundation. The balusters have a wood trim, and there are safety treads on the concrete steps. The lower part of the stairway leading from the ground floor is 8 ft. wide, but farther up it divides into two branches, each 5 ft. in width.

The lighting, heating and ventilation closely approach the ideal for a building of this class and location. The rooms on the first floor, which are not used for classrooms, are lighted by the usual method, having windows on one side and one end. The rooms on the second floor are

all used for classrooms, and they are all lighted, as is also the hall, by means of skylights. There are three of these to each room, and their aggregate area is half as large as that of the floor.

They are constructed of steel, copper and rough wire glass, and the curbs are built of brick and covered with copper flashing. The skylights all slope to the north and over them are placed steel sunshades, in such a manner that the direct rays of the sun are prevented from passing through at all times and only north light is allowed to enter the room. The light passes down from the skylights to the ceiling lights, which are in the flat suspended ceiling and which are about 25 per cent. larger than the skylights.

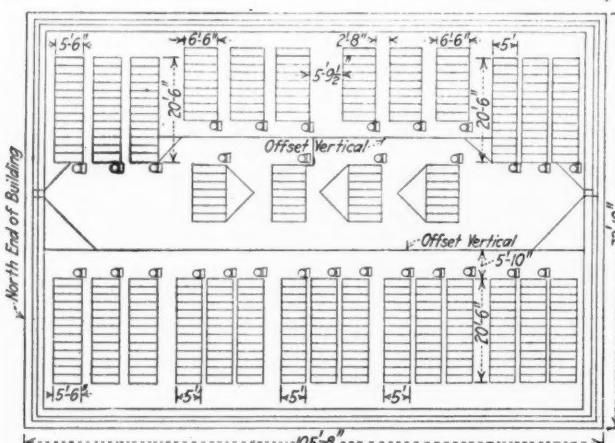
They are glazed with maze wire glass so that they cannot break or fall into the room. The sash are in small sections and are easily removed for cleaning. A great volume of soft diffused light is admitted by this method. There are no shadows, and no artificial light is ever needed in the daytime. The pictures show the beauty of this method of lighting, which is even better when all the shades are drawn on the windows.

EACH CHILD HAS 30 CU.FT. OF AIR PER MINUTE

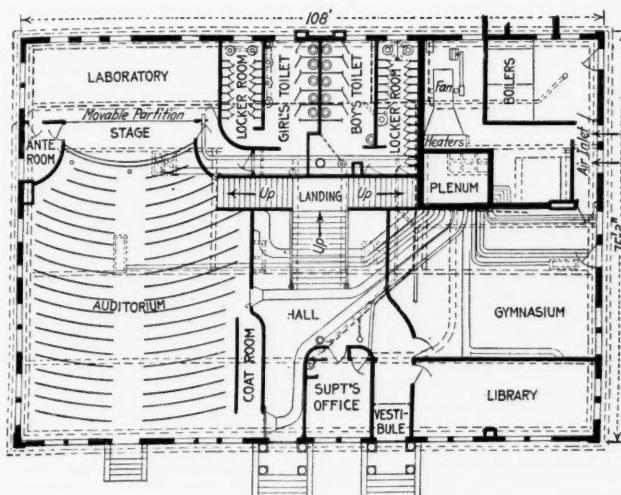
The heating and ventilation are accomplished by means of a fan-driven hot-air plenum system. The outside air enters the building at the south end, passing through a steam tempering radiator in the first partition and then through a cloth filter by which the dust is removed. It then passes through the fan to another radiator, where part of it is reheated and the rest is bypassed to the plenum chamber, which is double.

Here it is mixed by automatic dampers so that its temperature becomes that which has been determined as best suited for the classrooms. This temperature is regulated automatically by thermostats in each separate room, which do not allow the temperature to vary through a range of over two degrees. The air then passes out through the volume dampers, which regulate the heated air so that the proper amount to ventilate each room is provided. The quantity of course depends on the size of the room and the number of pupils, being 1,200 cu.ft. per min. for those classrooms that are designed for 40 students.

Only the temperature of the air is subject to regulation, the ventilating volume remaining constant at all



PLAN VIEW OF ROOF, SKYLIGHTS AND VENTILATORS



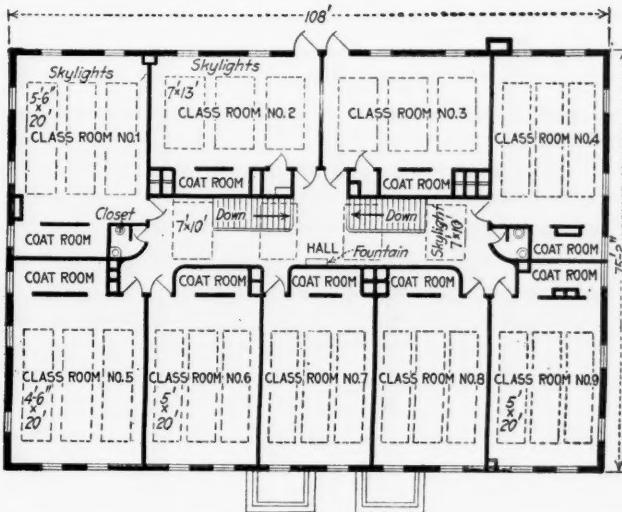
GROUND FLOOR HAS NOT A SINGLE CLASSROOM

times. The air then passes through the flues to the classroom and is admitted through an open register about $\frac{1}{2}$ ft. from the floor. This is made of comparatively large size so that the velocity of the issuing air is much reduced. The air then circulates through the classrooms and coatrooms, being still forced forward by the fan. Finally it passes out at the floor level through a register in the coatroom.

CLOUD OF WARM AIR ABOVE UPPER CLASSROOMS

The exhaust air from all the rooms then goes up through a vertical flue to a point above the suspended ceiling, thus warming and ventilating this space just as it does the rooms below. The suspended ceiling is the feature which does away with the previous objections to skylights, for the air space and the duplication of the window lights prevent excessive heat in the summer, and the heating system provides against sweating and cold drafts in the winter. With this provision skylights become ideal for lighting purposes. The air after warming the ceiling passes to the outside through the ventilators which are attached to each skylight.

The wires for the electric lights and the signal system are all in conduits and reach every room, so that the superintendent is always in direct communication with every part of the building. The plumbing and sanitary needs are fully met, there being plenty of automatic fixtures, closets, lavatories, showers and drinking foun-



UPPER-FLOOR ROOMS ARE LIGHTED FROM ABOVE

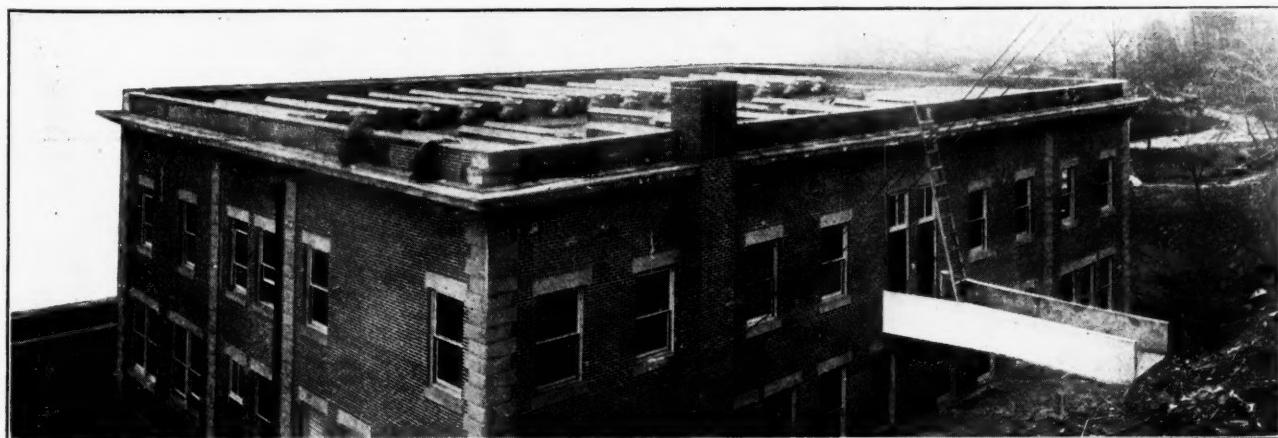
tains. Sanitary baseboards are used throughout the building, being of wood where maple floors are used and of concrete on concrete floors.

All wood floors are of maple, laid over concrete, and excluding the small amount of lumber employed in these, there is little wood used. The doors and window frames are of oak as are also the trim on the blackboards and in the coatrooms. The feature of the building which is noticed by strangers is the combination of safety, economy of space and general convenience of arrangement.

Every precaution has been taken against possible accident by fire. The heating apparatus is completely isolated in an absolutely fireproof room, in which no combustibles are kept. All waste spaces where rubbish could accumulate have been eliminated.

As a precaution against panic, all doors open outward and are fitted with panic locks which permit them to be opened from the inside whether they are locked or not. The halls, stairs and passages are wide, and it is easily possible to empty six rooms in single file simultaneously either down the stairs and through the front doors or through the two back rooms and across a bridge to the hillside.

The rooms are so grouped and the doors so placed that the distance traveled in going about the building is reduced to a minimum. The superintendent's office is located in front of the stairs and between the two entrances. From this central location he can follow



THE MOST INTERESTING VIEW OF THE SCHOOL, SHOWING SKYLIGHTED ROOF AND BRIDGE TO SAFETY

almost everything going on in the building with little effort and but trifling expenditure of time.

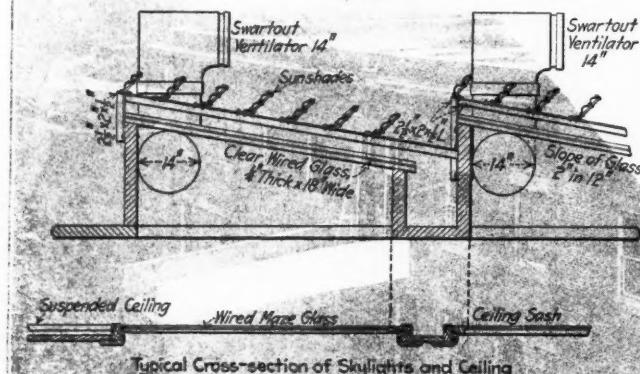
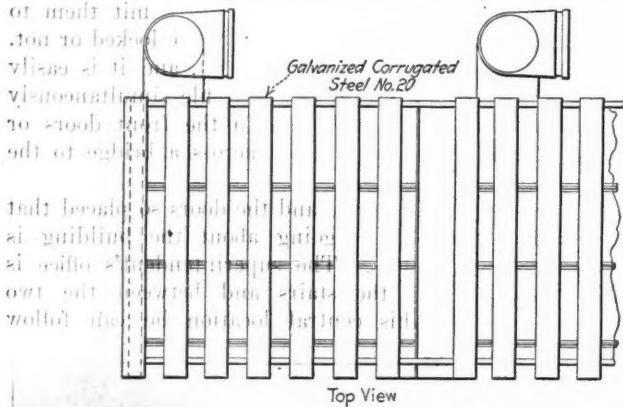
The painting and decoration is plain and subdued, the colors used in the classrooms being a flat tone of sage green for the walls and a buff tint for the ceilings. All other rooms are of a darker shade of green and light brown. The halls are enameled to a height of $5\frac{1}{2}$ ft. to prevent dirt and chalk marks from adhering to them.

Seven of the classrooms are designed for 40 pupils and two for 50, thus providing for the seating of 380 pupils on the second floor. The auditorium is located on the first floor and is furnished with 380 opera chairs. The floor slopes to the front about 16 in. in 50 ft., allowing everyone an unobstructed view of the stage. Much of the high-school work can be done in the auditorium, but whatever requires special equipment, as do domestic science and laboratory work, is taught in other rooms.

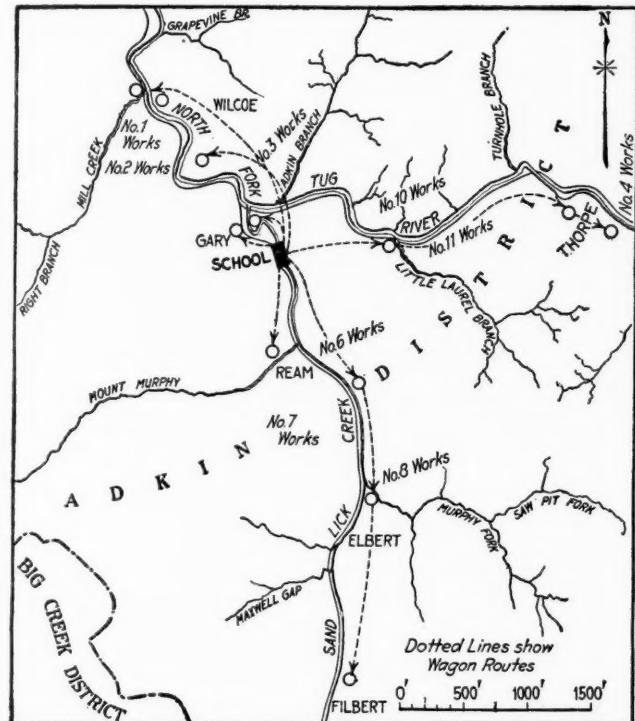
AN INSIDE PLAYROOM, OR GYMNASIUM, PROVIDED

The heater rooms are equipped with two Ideal boilers of the largest size and a 7-ft. Sirocco fan with 10-hp. motor. The radiators, compressors and water heater are also located in this room. The playroom in this building will accommodate about two classes at one time, and the playground outside is well provided with all devices for athletics. As the winters in this section are not very severe, games can be played in the open air at all times. There are many mining communities where such a building as this is much needed. All school districts that have as many children and have equal facilities for gathering the pupils together should erect a building at least as good as this and better if possible.

It is to be hoped that the day is not far distant when all school children shall be so housed that the parents can rest assured that no horrible catastrophes,



PLAN AND SECTIONAL ELEVATION OF SKYLIGHTS



MAP SHOWING WHERE CHILDREN ARE GATHERED

such as have occurred in the past, will happen again, and that the little ones who trip gayly off to school in the morning will rush home just as happily when they have been dismissed in the afternoon.

Shorter Hours for Bartenders

The Court of Luzerne County, Pennsylvania, the largest anthracite-producing county, has made the following announcement regarding the movement to require late opening and early closing hours for saloons, which has been steadily advocated by all the coal companies:

Relying to innumerable requests from representative individuals and organizations throughout the county, chiefly churches and larger employers of labor, in respect to the closing of bars in licensed places between midnight and 8 a.m., the court says:

"A majority of the judges question their power under the present law to impose such a condition, and therefore no order is made; but a minority of the judges hold that unwillingness to accept such a condition, which would prevent indulgence by laboring men on their way to work early in the morning, proves the unfitness of an applicant thus plainly bringing the matter within the power of the court. All the judges signify as their strong personal opinion that licensees ought, as many of them do, for their own welfare, to voluntarily submit to such a reasonable restriction upon their business."

"Those drinking places which by early opening catch the workmen on their way to the mines and shops impair the efficiency of labor and invite accidents, and should be in law, as they surely are in fact, public nuisances, to be abated without ceremony."

We are not sent into this world to do anything into which we cannot put our hearts. We have certain work to do for our bread, and that is to be done strenuously; other work to do for our delight, and that is to be done heartily; neither is to be done by halves or shifts, but with a will; and what is not worth this effort is not to be done at all.—Ruskin.

The Prospects of the Rocky Mountain Coal Mining Institute for 1916 are the most favorable of any period since its organization. A large number of new names have been enrolled, and great interest is being manifested in the next meeting, which will probably be held in Salt Lake City in June.

Discussion by Readers

Success in First-Aid Work

Letter No. 2—Following the reports of first-aid meets last year, I remember seeing in *Coal Age* [Vol. 8, p. 228] a letter severely criticizing some of the methods of judging the work performed by the different teams. I felt at the time that the criticism was just and that many of the suggestions offered were good.

The summer months will soon be with us again, and first-aid teams will be using their spare time in preparing to compete in contests, not only in Illinois, but in other states. I want to draw attention here to the main problem to be solved in this connection, which is the general plan and methods to be adopted in judging these contests. In previous first-aid meets the judges have been doctors only.

While there is much to recommend such a plan, it is clearly open to the objection that, owing to doctors being very busy men and subject to emergency calls at any and all times, it is difficult to secure a sufficient number of them to watch every movement of the different teams taking part in the contest and scattered over the field, so as to arrive at a correct and accurate judgment of their relative standing or merits. Though the judgment of a few doctors is fully competent, it is inadequate to meet the demands of the occasion. On the other hand, it may be possible to obtain a larger number of men less capable, but whose judgment, owing to their number, would be more adequate for the occasion than that of the few doctors to whom I have referred.

TWO CLASSES OF JUDGES TO BE CONSIDERED

There are thus two classes presented, and I would not attempt to choose between them as to their relative merits: 1. Competent judges giving inadequate judgment. 2. More adequate but less competent judgment by trained first-aid men.

Now it seems to me that it is worth while to consider whether it would not be advisable, under these conditions, to secure as judges in the coming first-aid meet this year, say half a dozen doctors who are competent to judge in regard to first-aid work and the same number of trained first-aid men from the Bureau of Mines rescue corps or other organization, provided, however, that the men chosen for this duty should have no connection with the teams that enter the contest. This requirement is a very important one in order to eliminate any chance of favoritism being shown in judging the contests.

I hope to see this subject discussed further by those who are interested in first-aid work and who may have some suggestions to offer that will bring good results.

—, Ill.

[The matter to which our correspondent has drawn attention is one of the greatest importance to all contestants in first-aid work at national or interstate meets. The readers of *Coal Age* will remember that there was some dissatisfaction expressed in regard to the manner in which the first-aid contests held last May in Birmingham, Ala., were judged. There is no question but that the points

mentioned in our correspondent's letter are worthy of careful consideration. We shall be glad to have the opinions of first-aiders everywhere in regard to the best method of selecting judges in these national contests, which have attracted such wide attention and interest in recent years.—Editor.]

Success in Mine Management

Letter No. 1—In considering the numerous small items that go to make up the successful operation of a mine, I want to refer to one that is often in evidence, although its influence is not apt to be as fully recognized as its importance deserves.

The item to which I refer is, in fact, one of the small wheels in the train that make up the complete working equipment of a mining operation. It acts as a wheel with imperfect bearings or mesh and serves to retard the movement and efficiency of the entire train. I refer to the extreme secrecy that is often practiced by coal-mining officials in respect to unimportant details a knowledge of which would greatly advance the education and efficiency of the employees in every branch of the work.

There are, no doubt, many things in the operation of a mine regarding which secrecy should be maintained by the mine officials in charge. On the other hand, there are many minor items that do not come in this category and regarding which information should be given that would be of interest and helpful to those performing the work. Comparatively few mine officials realize how much the efficiency of the working force would be increased by the frank and open discussion of some of these questions regarding which much secrecy is often maintained. Indeed, it is a matter that most mine officials have not seriously considered.

THE MINE MAP IN CLASS WORK

In this connection I will refer briefly to an incident that occurred some time ago in my own experience when I was instructing an evening mining class in the general principles of coal mining. The incident would be amusing but for its serious aspect and result. It was with great difficulty that I finally secured from the superintendent of the company a blueprint copy of a mine map, after explaining to him that I wanted to use the same solely as an illustration in the classwork. I explained, also, that it would be of great assistance in discussing the different questions that come up in the class.

The superintendent met my request with the objection that "if the blueprint should be used as a plan for any other operation the boss would raise Cain about it." It was only my promise that the blueprint would not go out of my hands, and would either be destroyed or returned to him, that enabled me to secure the use of the copy for the purpose desired.

This illustration will serve to show that there often exists in the minds of mine officials a narrowness of conception that greatly retards the evolution of the highest

FIRST AIDER.

efficiency in mining work. Yet it is common to hear these same officials boastfully claim how much they are doing to instruct their miners in better ways of performing their work and increasing their own safety. I want to draw a little comparison between the attitude of such mine officials toward other operations and that manifested by the average coal miner toward his workfellow.

For the sake of illustration I will assume that the man at the face, John Smith, is driving an entry and Jim Brown starts to turn a room not 20 yards away. What will Smith do? Will he try to hinder Brown or attempt to hide from him any knowledge he has gained by having worked many years in this field? No, bless your heart, Smith goes to Brown, sees if he has everything he needs, tells him the best way to shoot his coal, and the chances are that before returning to his place he may remark, "Now Buddy, if you need any powder, soap or paper, go to my box and help yourself." I am glad to say this is the prevailing spirit among the old and better class of miners. "Help your buddy" seems to be their slogan.

THE GET-TOGETHER SPIRIT AMONG OPERATORS

I am glad to be able to say that I have observed many instances where the same spirit prevails among operators, but this is often shortlived, and too often a cut-throat policy takes its place. The spirit manifested at operators' meetings is often quite different from that with which one operator treats a competitor in the same market or operating in the same district. While harmony exists in respect to common protective measures, in a joint meeting the get-together spirit seems to disappear entirely when the most efficient methods of mining and the most successful management of an operation are to be considered.

What is an operator more than a successful miner that has risen to an independent position? As a miner, he was obliging to his buddy, obedient to instructions, willing to help anyone in trouble or one who was less intelligent or experienced than himself. Let operators who have come up from the ranks remember that it has been these qualities that have made them what they are today. We all need a broader perspective of our own occupation. We should realize that, when we impart an idea or help another by suggestions, it will, like the bread cast upon the waters, return to us again. WILLIAM CROOKS.

Kimberly, Ala.

Letter No. 2—We often hear mining men who have been in the coal business a number of years say that mines operated by electricity are not able to get the coal out as cheaply as the old pick mines operated with steam and air. No doubt this statement is true in some cases, but if so, it is due to poor management. Too many superintendents have the idea that any man who is able to change an armature in a haulage motor or mining machine is an electrician, and therefore able to take care of an electrically operated mine.

I have in mind a large coal company that had equipped one of their mines with the most up-to-date electrical machinery, which for some reason for about 2 years had proved a complete failure. There were altogether 12 haulage motors, and the mine foreman was able to get enough coal to keep everyone of them busy 10 hours each working day, but somehow there never were more than seven or eight of the motors in working condition. That

company had six so-called electricians in less than one year. Those that did not leave inside of a month were fired for incompetency, and the highest salary paid to any one of them was \$80 per month.

But one day a young man came along and applied for a job as electrician who, by the way, had learned his trade in some European country. He told the superintendent that if he would give him a trial, he would work one month on the condition that if his work was not satisfactory he would ask no pay; but on the other hand, if satisfactory he would expect \$125 per month. At first the superintendent did not want to listen to such an agreement but finally decided to take a chance, and put the young man on the job.

A COMPETENT MINE ELECTRICIAN

Unlike the others before him, this electrician spent most of his time in the mine. He soon found that there was enough trolley and feeder wires strung in the entries to carry all the load with a very small drop in voltage, if they had been put up right. So he proceeded to make all the joints electrically and mechanically perfect and tap the feeders onto the trolley at short distances. He next asked the superintendent to let him see the requisition of all the electrical supplies that had been bought in the last six months and found that there had been enough compressed bond purchased in that time to bond every single joint in the mine.

In this mine there were two track gangs—one for the small steel and one for the heavy steel. Their orders were to bond every joint of rail and cross-bond all switches, compressed bond being used for the heavy steel and wire bond with channel pins for the small steel. When these men were asked where their bonding tools were, none of them knew. In fact, they did not remember having seen any such tools. Yet all the bonding material had been taken inside and most of it put somewhere along the rib and forgotten. Many of the compressed bonds were put under the fishplates, and the few that had been put in were flattened out with a hammer.

MINE SUPPLIES BOUGHT AND WASTED

The electrician now asked the superintendent to put one man in each gang under his supervision, so that he could hold him responsible for the bonding. This request being granted, all the bonding was looked over and soon put in such a shape as to stop the almost daily occurrence of burned-out armatures. The electrician also noticed that anybody who knew how to open a controller was put on as motorman. With the permission of the superintendent he gave the motormen instructions how to handle a motor without injury to the armature or resistance, and at the same time pull more cars than they had been hauling, while using less power. He then connected an ammeter and voltmeter on a motor and had each motorman pull a certain number of cars, and showed them plainly the number of amperes each one consumed. In that way he soon developed a set of motormen that were a real asset to the company, as all motor trouble disappeared.

Six months saw a great change in this mine. It was a novelty to see a motor broken down. The mine foreman was a different man; in fact, everybody seemed to be in better spirits. Where they used to hoist 600 and 700

cars a day, they now hoisted 1,100 and 1,200 cars, with much less effort. The upkeep of the motors had been cut in two. Only eight months before, the management had about decided to do away with electric-haulage motors and use air motors, as the coal was cut with air punchers. Inside of six months this young electrician had turned failure into success in spite of all the bad feelings, and objections he encountered.

There are a good many electrically operated mines that could almost be called failures, owing to the employment of men who have not the ability and initiative to take charge of such equipment, but work under the supervision of the mine boss. On the other hand, most of the larger companies have, in the last few years, come to realize that the only way to get results is to run their mines on a department-store plan, by having a coal department and an electrical and mechanical department and getting experts at the head of each department.

Logan, W. Va.

C. J. FUETTER.

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Handling Explosives in Mines

Letter No. 6—I beg to offer the following suggestions in regard to one of the most important subjects thus far discussed in *Coal Age*:

Explosives should be stored on the outside of the mine in a heavy masonry or metal magazine having a light roof, which should be the weakest part of the structure, so that in case of an explosion its force will be largely projected upward. The magazine should be located at a safe distance from the mine openings and buildings. Whenever practicable, it should be located in a sidehill or dirt bank as a dugout or cave.

Caps, exploders and squibs, especially the two former, should be stored in a separate building. Open lights or smoking should not be allowed in either building, nor should any person be permitted to enter except those whose presence is required and authorized. Each miner should be allowed to take but one day's supply of explosives into the mine each day, so as to reduce the amount of explosives underground to a minimum. If black powder is used, each miner should carry his day's supply in a metal canister. Squibs should be carried in metal squib cases, and caps or exploders can best be carried in a small wooden block with holes bored in it, into which the caps or exploders will fit neatly, each hole being stopped with a tightly fitting plug.

TAKING EXPLOSIVES INTO THE MINE

If the working faces are not far from the mine opening, when the miners walk in they may carry their day's supply of explosive in with them, obtaining this at a station conveniently and safely located where the day's supply should be brought from the magazine. The miner's canisters should be previously filled at this station by an authorized person. This building or station, like the storage magazine, should be of metal or masonry with a clay or wooden floor. The same strict rules should apply here also, and no one should be permitted to enter the building save the one in charge. The canisters should be fitted in a receptacle to prevent any powder being spilled on the floor.

If the miners ride in, especially where electric haulage is used, the day's supply of explosives should be taken

into the mine during the night shift, in a wood-lined car having no exposed nails, and deposited in a station or stations inside, where the men can get their supplies as they go to work. These stations should be cut into the solid coal, the open side being closed with a masonry or metal wall provided with a metal door, and no open lights, smoking or unauthorized persons must be allowed therein.

KEPT IN LOCKED BOXES AT THE FACE

In the mine the miners must keep their explosives in locked boxes, which should be placed a sufficient distance from the working face, so that any flame or flying coal from shots cannot reach them. The box should stand around a corner, out of the line of possible blasts. The necessary precautions regarding proximity of open lights and smoking when handling explosives are too well known to be given more than passing mention.

I want to urge the more extensive use of permissible explosives for blasting coal and rock in mines, in preference to dynamite. The extra cost of permissible powder will be more than compensated by the increased safety resulting from its use. Permissible explosives should be used exclusively wherever the coal can be shot with it and a marketable product obtained. Unfortunately this can not always be done at the present time, but it is to be hoped that the manufacturers of explosives will yet devise something that will enable black powder to be removed from coal mines.

Where black powder is taken into the mine in kegs these must never be opened by driving a pick into the top of the keg, which has been a too common practice of some miners and has cost many lives, owing to the blow from the pick striking a spark and igniting the powder. The keg must be opened by pulling back the little slide that covers the opening. Boxes containing explosives of any character should be opened with a wooden wedge and mallet, which should be kept for that purpose.

EDWARD H. COXE.

Knoxville, Tenn.

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The Miner and Safety First

Letter No. 6—In discussing the safety of the miner, it must not be forgotten that this is closely connected with his efficiency in the mine. Indeed, safety and efficiency in coal mining go very largely hand in hand. The miner that is efficient in his work will generally be found to be one that protects himself from the dangers with which he is familiar. He does this from force of habit. He knows that it is easier and will require less work to set a post under a loose piece of slate than to clear up the fall, and he knows too well that the neglect to do this in time may cost him his life.

The coal-mining industry is facing a shortage of men in the near future. Reference has been made to this in the letters that have appeared in recent issues of *Coal Age* on "Immigration in the Future." To offset this coming shortage of men it is necessary to secure greater efficiency among miners. When mine officials have been able to obtain 100 per cent. efficiency in their miners, they will have solved the problem of shortage of miners to the best of their ability. The question arises, how shall this be accomplished?

In my opinion, careful training and strict discipline will teach the miner to be efficient in his work and will bring the results desired and necessary in the economic operation of a mine. Let coal operators instruct their miners in the proper methods of mining and blasting the coal. Teach them how to keep their working places in a safe and healthy condition and make them realize that then and then only will they be able to do the amount of work required of them. Relieve the miner of the extra work he is often obliged to do because no one is at hand to do it for him—work that should be attended to by men charged with that duty. The miner will then be able to give his whole attention to the mining of coal, which is necessary in order to maintain a regular output of coal.

The extra work that miners are often obliged to perform for themselves is switching cars, baling water, handling rock on the road, etc. If this work is properly done by others appointed for that purpose, greater efficiency will be produced in the miner. The miner is a human machine, and like other machinery, he can exert only a certain amount of horsepower. If he exerts 50 per cent. of that power doing other work, his efficiency as a miner is decreased to that extent. W. H. SAULSBERRY.

Seanor, Penn.

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Thrift Among Miners

Letter No. 3—In reading the interesting letter of John Rose, *Coal Age*, Mar. 4, p. 426, I was impressed with the idea that he had sounded the right note in reference to thrift among miners when he expressed the opinion that the lack of banks in mining towns is not the main reason for the miners' money going to waste. I have resided in mining towns since I was born, and lived in log-sided cabins as well as in the most up-to-date houses of model mining towns today, where the streets were paved and moving pictures, opera houses, banks, post offices and every other convenience that goes to make a little city were provided.

In every locality I have found the same element of humanity—the same improvident expenditure of means. For example, the coal digger making \$5 a day is generally observed to have nothing but the clothes on his back, while the driver earning \$2.50 a day is found to own his own home and, perhaps, to have a snug bank account besides. The fact that the bank, in one case, was located in the same building as the coal office and the miner had no need to go out in order to deposit his money made no difference in the final result, which will always be the same regardless of the bank being conveniently located.

THE SOCIAL SIDE OF THE QUESTION

This question of the improvidence of miners has a social side that is too often given little or no consideration but which enters the problem of home life of mine workers to as great or even greater extent than is true of other industrial classes, because of their peculiar isolation from the rest of the world much of the time.

Some people are born spendthrifts, while others are born to save what they earn. The temptations to spend money are found on every hand. The saloon invites the men to spend their money for drink, while their wives

and children go without food and clothes. In other cases family extravagance is responsible for the large expenditures. Sometimes the money goes for amusements and other pastimes and sometimes for costly gowns that are in fact above the social standing of the women who wear them.

I have observed this extravagance of dress in many mining towns where, according to general public opinion, the people are impoverished and often objects of charity. Closer observation and more intimate knowledge would have revealed the fact, however, that the money earned was foolishly spent instead of providing those things that were more needed in the daily life of the people.

IDLE DAYS INVITE WASTEFUL EXPENDITURE

Permit me to suggest that one great reason for the miners' wasteful expenditures is the numerous idle days when they are forced to loiter about town instead of being at work in the mine. This, together with the short hours the miner must work, as compared with other occupations, gives them much spare time, and unless a man is naturally industrious his idle hours drag heavily and he must find some sort of amusement or pastime to employ them. Thus many opportunities are afforded for spending money. A comparatively small number of miners spend any time reading or studying to improve themselves. Their habit is to congregate on the streets or in the stores and tell stories or otherwise pass the time away.

It is this phase of the subject that needs the most careful study of those interested in the welfare of mine workers. Being shut out from the sunshine most of the day, the miner feels the need of recreation and companionship in his off hours, and finds this where he may. One of the greatest needs of mining towns today is a good Y. M. C. A. organization that will provide these recreations and pastimes for the miner. As miners become more educated through such efforts in their behalf, a change will be effected and habits of idleness will give place to those of study and self-improvement. These habits will develop thrifty miners who will save their money and provide homes for themselves and their families. In this way, the floating population of mining camps will gradually disappear. Efforts in education I believe will do more good than the providing of any number of banks in mining towns. Miners are always suspicious of banks and other corporations controlled by men of capital.

THRIFT MAY PROVE A PRACTICAL HINDRANCE

Permit me, in closing, to remark that thrift among miners has one drawback. It often happens that the foreman, with the desire to help the more needy, gives the best places in the mine to such men, and the thrifty man must wait his chance. Attention has been drawn to this frequently in *Coal Age* by showing how the man who runs a high store bill is favored by the mine foreman and given a good place to work in hopes that he will be able to square himself at the store. I want to say that this is not a wise plan. Every man should have an equal chance in the mine. Anything else discourages the idea of thrift and lessens the efficiency of the working force. I hope that this discussion will open the eyes of many miners who have given little thought to their wasteful spending of money that should go for other things.

Cleaton, Ky.

OSTEL BULLOCK.

Inquiries of General Interest

Wet and Dry Air Compared

We are having quite an argument in our mine, among the firebosses and assistant mine foremen, as to whether the atmosphere is heavier or lighter when it is raining. It is claimed by some that wet air is heavier than dry air, while the reverse of this seems to be indicated by the fact that the barometer is usually lower during a storm or when it is raining. **MANY DISPUTANTS.**

Sykesville, Penn.

As has been frequently stated in *Coal Age*, air containing moisture is always lighter than air that is dry or that contains less moisture, volume for volume and under the same pressure. This is owing to the fact that, as explained in *Coal Age*, Vol. 6, p. 156, water vapor which has a specific gravity of 0.6235 is lighter than the air which it replaces. Vapor does not saturate the air, as is commonly supposed, but the space it occupies, since for any given temperature the same weight of water vapor serves to fill a given space whether that space contains air or is a vacuum. It is therefore clear that, as the vapor which is lighter than air displaces a certain portion of the air in a given space, air containing moisture will weigh less than dry air, bulk for bulk. We may add, however, that the chief reason of the low barometer at a storm center is due to the upward rush of the atmospheric current at that point, rather than to the unit weight of the moist air.

■

Shaker-Screen Problems

I have been much interested in the installation of shaker screens at coal tipples and would like to see the following questions answered in *Coal Age*:

1. What is the correct method of estimating the horsepower necessary to drive either a single- or a double-shaker screen, at an angle of 180 deg. with the driving shaft?

2. What are the relative stresses shown by shaker screens in a vertical and horizontal direction, with reference to ascertaining the necessary strength of the members supporting the driving shaft?

3. What is the most satisfactory method of taking up the shaker strains and preventing the transmission of the vibrations produced by the operation of the screens from extending throughout the tipple and reaching the headgear of the hoisting shaft?

These are matters of considerable importance to us, and their solution I believe will prove of equal interest to many others.

MINE SUPERINTENDENT.

—, Ill.

The question of taking up the stresses arising from the operation of shaker screens is largely one for the constructing engineer. The proper framing of a wooden tipple or the design of a steel tipple must be such that the several members will take up these stresses and

transmit them to the foundation of the structure in the most direct manner possible. The entire structure, as every engineer knows, must have sufficient stability to successfully resist the particular strains and shocks to which they will be subject.

In answer to the questions asked and in response to our request, Raymond G. Lawry, Chicago, Ill., an engineer of experience in the design of coal tipples and shaker screens, writes as follows:

1. There is no difference in the horsepower of a single- or double-shaker screen. The horsepower of a shaker screen is affected only by the weight of the screen and the material, the length of stroke and the speed of vibration or number of revolutions of the driving shaft per minute. There are no exact formulas available for calculating the horsepower required to drive shaker screens, but in my experience during the past 10 years, I have found the following formula to give good results and to be entirely safe:

Assuming W equals weight of screen and material, in pounds; n equals speed of driving shaft, in revolutions per minute; and l equals length of stroke, in inches, the horsepower H applied to the driving shaft may be calculated by the formula,

$$H = \frac{Wn^2l^2}{28,000}$$

2. The reaction produced in the operation of the screen is transmitted through the eccentric rods to the driving shaft. This force is in the direction of the rods, which are generally horizontal. It may be calculated by first finding the acceleration in the same manner as that employed in the case of a steam engine. The formula for finding the acceleration is

$$f = \frac{v^2}{r} = \frac{(2\pi rn)^2}{3,600r} = \frac{\pi^2 n^2 l}{1,800 \times 12}$$

in which f equals acceleration, in feet per second; v equals velocity of crankpin, in feet per second; r equals radius of crankpin circle, in feet; l equals length of stroke, in inches.

But the force F is equal to the mass m times the acceleration f ; thus, $F = mf$; or, since the mass is equal to the weight W divided by the force of gravity g ,

$$F = \frac{Wf}{g} = \frac{W}{32.16} \times \frac{3.1416^2 n^2 l}{1,800 \times 12} = \text{say } \frac{Wn^2 l}{70,000}$$

As an example: For a 6-in. stroke and 100 r.p.m., this force is $F = 0.85 W$. If the screen is unbalanced, this full force is transmitted from the drive shaft to the structure. In the case of a pair of screens at 180 deg., the force due to the difference in the weight of the two screens is the one to be provided for.

3. The strains transmitted to the supports of the driving shaft must be provided for in the swaybracing throughout the structure. Turnbuckles should be provided by means of which the slack can be taken up from time to time so as to produce the required rigidity in the structure.

Examination Questions

West Virginia Mine Foremen's Examination, 1916

(Selected Questions)

Ques.—Under what conditions would you consider coal dust dangerous in mines?

Ans.—Coal dust is always an element of danger in mines to a greater or less extent, according to the fineness and inflammability of the coal and the extent to which gas is generated in the mine. Coal dust is an element of greater danger in the working of soft coal than when mining anthracite. The coal-dust danger is much increased where blasting is performed in the mine, especially if gas is present even to a small extent. The danger is much greater where black powder is used for blasting. Only permissible powder should be used in the mining of a soft, inflammable coal.

Ques.—Should the fireboss report dangerous conditions, owing to gas and dust in a portion of the mine, what precautions should the mine foreman take to safeguard the employees?

Ans.—On being informed of the dangerous condition of any portion of a mine, the mine foreman should take measures to prevent persons from entering that section except those who are competent and authorized to remove the danger. If men are already working in that section, these should be promptly withdrawn and all entrances to that portion of the mine carefully guarded. Before men are again permitted to enter the place, the entire section should be examined by a fireboss and reported as safe for work.

Ques.—What are the dangers due to the use of electricity in and about mines?

Ans.—When the installation is imperfect from any cause or improperly made by an incompetent person, there is danger of fire resulting from the short-circuiting of the current or the sparking of wires producing the ignition of gas that may be present, or a shock may occur by accidental contact of men or animals with unprotected live wires on traveling roads or at places where it is necessary for men and animals to cross under the wires. An accidental fall of roof may break down the electric wires and increase these dangers where the installation has been improperly made. Such an accident cannot always be foreseen, but it is important to guard all electric installations under a weak roof by securely timbering the entries. The switchboard of an electric installation should be placed where it will not be accessible except to the mine officials in charge. All motormen and others in charge of electric machines or motors must be thoroughly acquainted with electricity and the duties they have to perform, in order to avoid accidents arising from ignorance on their part.

Ques.—How would you prevent accidents from mine cars?

Ans.—The answer to this question will depend largely on the method of haulage employed, the size of the out-

put and the general plan of the mine. All haulage roads should be wide enough to allow a sufficient clearance on one and the same side of the road for men to pass the cars safely. Haulage roads should not be used as traveling-ways. Men should not be permitted to climb between the cars of a trip standing on a sidetrack or parting. No attempt should be made to couple cars until they have ceased to move. All cars should be of the same type or kind and provided with sufficient bumpers to prevent the bodies of the cars from coming together.

Where motor haulage is employed, no one but the motorman and a possible triprider should be permitted to ride on the locomotive, and no one should be permitted to ride on a loaded trip or in cars carrying tools or powder. In mule haulage the driver should not be allowed to ride on the tail chain. No doors should be placed at the foot of a grade. In gathering hauls where two or more drivers are working on the same parting, they should work together in order to avoid the chance of a collision.

Ques.—What methods would you adopt to reduce accidents from falls of roof and coal at the working face?

Ans.—Every miner should be instructed to make a careful inspection of his working place when he first enters the same and before starting to work. He should inspect both the roof and the coal at the face and replace all timbers that may have been knocked out by the shots the night before. A reliable system of timbering should be employed that is best adapted to the particular conditions of roof and floor.

Under a frail roof, posts should be set in rows parallel to the face and at distances apart varying from 2 to 4 ft., according to the amount of roof pressure and the character of the roof and floor. The posts in alternate rows should be staggered so that they will not stand directly behind each other in succeeding rows. All coal should be spragged while being mined, and if necessary, "cockers" should be stood against the face of the coal. The latter is only necessary where the coal is quite weak or the seam has a considerable thickness.

The miner should examine his roof at frequent intervals during the day, and particularly after firing a shot, before proceeding to work. Every working place should be regularly inspected by the mine foreman or one of his assistants, at least once a day while the men are at work. If timber is needed, the foreman or his assistant should see that the miner sets what posts are required without delay.

Ques.—Why are permissible powders safer than black powder?

Ans.—Permissible powders are safer than black powder because they produce little flame, and this has a temperature much below that of the flame produced by black powder. The flame of permissible powder is also shorter and has a lower temperature than that produced by the explosion of dynamite. Also, the flame of permisibles is of short duration. Owing to these facts, permissible powder is much safer to use in the presence of gas or dust, because the danger of ignition is much less, owing to the short duration and low temperature of the flame produced.

Coal and Coke News

Washington, D. C.

A general investigation into the Lake cargo coal rates has been ordered by the Interstate Commerce Commission upon its own motion. This general investigation will involve the reasonableness and propriety of the rates on bituminous coal from mines in Pennsylvania, Maryland, West Virginia, Virginia, Kentucky and Ohio to the lower Lake Erie points for transhipment over the Great Lakes. The ports involved in the issue are Erie, Conneaut Harbor, Ashtabula, Fairport, Cleveland, Lorain, Huron, Sandusky and Toledo. The case brought to the Commission upon the complaint of the Pittsburgh Coal Operators' Association will be combined with this general investigation.

The Commission has fixed Apr. 24 next as the date for beginning the hearings in the new investigation. The roads which are made respondents are the Bessemer & Lake Erie; Baltimore & Ohio; Baltimore & Ohio Southwestern; Cincinnati, Hamilton & Dayton; Chesapeake & Ohio; Hocking Valley; Pennsylvania Co.; Pennsylvania R.R.; Pittsburgh & Lake Erie; Pittsburgh, Cincinnati, Chicago & St. Louis; New York Central; Norfolk & Western; Vandalia; Wabash-Pittsburgh Terminal Ry.; Western Maryland, Wheeling & Lake Erie, and the West Side Belt R.R.

There has long existed dissatisfaction over the difference in rates on lake coal from the Pittsburgh district and from the West Virginia district and competing mines. In a previous decision the Commission directed that a part of the then existing discrimination be removed. The result was that the roads increased the Pittsburgh rates. Now the Pittsburgh rate of 78c. per ton has been assailed by the coal operators of that district. The Commission has arrived at the conclusion that proper adjustment of these rates can be more "equitably, expeditiously and comprehensively considered and disposed of by a general investigation into the entire situation." Not only has the Commission before it the formal complaint against the 78c. rate from the Pittsburgh district to Ashtabula but it has also received numerous informal complaints directed against the present rates from mines in Pennsylvania, Maryland, West Virginia, Virginia, Kentucky and Ohio. All of these will be considered together.

Petition for Reopening

A petition for a reopening of the anthracite coal case has been filed with the Interstate Commerce Commission by the Central of New Jersey, Erie, Delaware & Hudson; Lehigh Valley; and New York, Ontario & Western railroads. In particular the Commission was requested by the roads to permit the continuation of the present schedule of rates on prepared sizes and on smaller sizes from the anthracite region to Albany, Troy and Mechanicville, N. Y. Since these points are rate basing points for the New England territory the scope of the petition is much broader than appears upon its face.

It was contended in a separate complaint filed by the Delaware and Hudson that when fixing reduced rates to these three New York points the Commission measured the distances over the short routes, and if the reduced rates are put in effect on Apr. 1 as directed, the more circuitous roads will be excluded from the traffic. In a separate complaint filed by the Central of New Jersey it was contended that the discrimination in rates between the coal of prepared sizes and coal of the smaller grades, the Commission fixed rates for the latter at 82 per cent. of the rates for the former. This, it was said, is merely an arbitrary difference and does not represent a true measure of the competitive value of the two classes of coal.

The joint petition to the Commission signed by all of the roads asking for the reopening of the case, stated:

The undersigned respondents make this request because they firmly believe that full investigation of the situation will disclose that the rates now prescribed by the Commission, effective Apr. 1, 1916, of \$1.65 on prepared sizes and \$1.36 on pea and smaller grades to the points named are unreasonably low, are not justified by the record, and are inconsistent with the remainder of the rate structure prescribed by the Commission; and because, as is well known to the Commission, it will be exceedingly difficult if the rates of \$1.65 and \$1.36 respectively once go into effect, to restore rates to the reasonable basis herein suggested even though at a later time the Commission should conclude that such basis is just and reasonable. The rates which will go into effect on Apr. 1 next will immediately become the basis for contracts for the sale of coal and various interests will thereby become estab-

lished on the basis of the rates so going into effect, so that any subsequent modification of those rates will work hardships which could not arise if the situation is temporarily protected in the way herein requested. Furthermore questions of burden of proof may take a different, and from the standpoint of respondents a more difficult, status, if the said rates of \$1.65 and \$1.36 once go into effect.

Respondents further suggest that if the Commission permits the rates here suggested of \$1.85 and \$1.60 (as maximum, no existing rates to be increased) to be temporarily put into effect on Apr. 1, no interests can suffer thereby, because, in the event the Commission shall later decide that those rates should be reduced, the Commission can protect all persons affected by awarding reparation back to Apr. 1.

Respondents further respectfully represent that an additional reason for permitting the temporary relief here requested is that otherwise the rates of \$1.65 and \$1.36 which respondents respectfully protest are unreasonably low, will at once become the basis for adjustments of rates into New England territory because the rates from the mines to New England are made up of the rates charged by the carriers in New England business from the Albany gateway to destination, and it will be exceedingly difficult, after rates shall once have been adjusted on that unreasonably low basis to readjust the rates into New England territory upon a more reasonable basis.

HARRISBURG, PENN.

The smaller hospitals throughout the coal regions of the state which handle a great many cases from the coal mines, are seriously considering following the lead of 27 of the larger institutions, which have combined in a fixed schedule of prices for the treatment of patients who came under the Workmen's Compensation Act. Harry A. A. Mackey, chairman of the Workmen's Compensation Board recently wrote to the Governor charging that many hospitals all over the state had been fostering petty graft by doubling their rates to employers in accident cases. The Association of Hospital Superintendents at a recent meeting took the matter up and adopted uniform rates for industrial accidents. These rates are as follows:

House cases, bed, board and general nursing, \$2 a day; minimum charge, \$5 operating room fee, \$5; laboratory examinations, which often are not needed, \$2 to \$5.

In all these cases the ambulance service is free, while the serums, drugs and vaccines required are given at the cost to the hospital. Receiving ward and dispensary cases, first and subsequent dressing, \$1; anesthetics, \$3.

Other fees—Minor operations, \$2 to \$5; major operations, \$25 to \$50; X-ray examinations, \$3 to \$10; reducing and dressing fractures, \$5 to \$15; reducing and dressing dislocations, \$3 to \$10. No charge will be made for written reports as to the condition of the patients, but \$3 to \$5 will be charged for special examinations and full reports of the cases.

PENNSYLVANIA

Anthracite

Hazleton—Officials of the Lehigh Valley Coal Co. are having great difficulty in purchasing sufficient mules to meet their purposes. Because of the war the animals are scarce and extremely high in price. Despite the fact that this company has practically equipped all its collieries with electric haulage there are always certain grades of work which necessitate the use of the mine mule.

Nesquehoning—Fire of unknown origin on Mar. 24 damaged the Lehigh Coal and Navigation Co.'s boiler house at No. 14 colliery to the extent of \$2,500.

Morea—The C. M. Dodson Coal Co., operating the Beaver Brook and Morea Collieries has provided a handsome club house for the use of the young persons of both sexes at Morea. A course of lectures on sociological topics is being arranged.

Bituminous

Pittsburgh—The Consolidation Coal Co., which has been conducting extensive development operations in Somerset County announce that its two new collieries in the Jenner field are now ready to make shipments.

Uniontown—About 185 employees of the mechanical and electrical organization of the H. C. Frick Coke Co. and the Trotter Water Co., recently attended a meeting in the City Hall for the purpose of listening to instructive talks by I. C. Kelly, master mechanic, W. A. Chandler, electrical engineer, and others. A general discussion followed each address and the meeting was highly instructive throughout.

Arnold—Following reports made by the Street Committee, the Borough Council of Arnold is taking steps to prevent further damage from sinking of streets which pass over the mines of the Valley Camp Coal Co. The subsidence is becoming so marked that gas and water mains are breaking, and in places several inches of depression are shown. Precautions against flooding through breaking water mains are being taken by the water company.

Rockwood—For the first time in some months, the supply of cars was recently approximately normal, and all of the mines which shared in this supply worked full time, long trains being sent out. It is predicted by some operators that the inconvenience from lack of car supply will become less in the future and the supply will be better.

Big Bend—All the operations of the Big Bend and Commercial coal companies have been shut down for some time, the men having walked out because of a disagreement with the coal companies over the question of payment for pick mining. It is thought that the men will not return to work prior to the beginning of a new agreement some time in April.

Connellsville—The coke production of the Connellsville region for the week ending Mar. 18 was approximately 432,000 tons or a decrease of 25,000 tons from the preceding week. Shipments amounted to \$429,000 tons, or a decrease of 33,000 tons.

Brownsville—The overflowing of the large reservoir at the Royal Works of the W. J. Rainey Coke Co. recently threatened for a time to flood the workings of the mine and endanger the lives of almost 200 miners employed therein. Warnings were sent to all portions of the mine and the workmen summoned to the surface. A large ditch, which was excavated by the men from the mine, changed the course of the water and prevented flooding.

WEST VIRGINIA

Fairmont—A meeting of the Central West Virginia Coal Association, held here on Mar. 24, brought out discussions regarding the car situation and coal rates in the Fairmont and Pittsburgh districts. Operators state that thousands of cars loaded with coal have been kept standing on tracks, being held by the railroads for their own use in case of a rise in price, and they demand the release of these cars. An inadequate supply of cars for loading is also claimed. The whole matter will be vigorously presented to the Interstate Commerce Commission, which, it is pointed out, has so far heard only the railroad side of the case.

The Federal court has confirmed the sale of the Four States Coal Co.'s holdings, which took place here on Feb. 9.

Bluefield—It is reported that an explosion occurred on Mar. 28 in the east entry of the King Coal Co.'s mine, at Kimball, between here and Welch. Four bodies were soon recovered and shortly afterward the rescuers found four other men badly burned but still alive. It is believed that approximately 100 men were entombed in the colliery.

Logan—The H. T. Wilson Coal Co. of this city was recently helped in the demolition of an old tipple by a March gale. During the noon hour, a gust of wind tore off the roof of the old tipple. No one was hurt. This structure is being demolished to make way for a new modern tipple and the accident helped rather than hindered the plans of the company.

The Guyandotte Valley Coal Operators' Association has announced a voluntary increase of 5 per cent. in wages, effective Apr. 1. It is estimated that the increase amounts to about \$40,000 a month for the district.

Montgomery—There is a heavy demand for men at all coal mines in this vicinity and throughout the New River field. This is especially true of the mine operations along the Kanawha and Michigan Ry. Hundreds of men could be accommodated at the mines along this road.

North Fork—The Ashland Coal and Coke Co. recently erected at its operation one of the most up-to-date playhouses in the coal field. This theater has a seating capacity of 300 and has been given the name of "The Palace." It was recently opened in moving-picture entertainments.

Morgantown—E. N. Zern, Professor of Mining Engineering at the West Virginia University, has announced a six weeks' course in mining at Morgantown, beginning June 19, in which persons can prepare for positions as foreman, mine foremen and superintendents. There will be no tuition fees.

Milburn—The Milburn Coal Co., J. H. Morton, general manager, has just completed 30 new houses for employees, fitting them with running water, toilets, kitchen sinks, etc. The company has also purchased 300 rose bushes to be planted along the fences between the employee houses.

Wheeling—Coal shipments on the Ohio River have not been as low as at the present time for years. Most of the orders at present received by the operators are rush orders and require shipment by rail.

ALABAMA

Birmingham—Two thousand three hundred dollars was paid to the convicts working in the Flat Top mines of the Sloss-Sheffield Steel and Iron Co. for over-task coal mining and loading during the month of February. Half of this was for additional coal gotten out by the convicts over the tasks assigned by the state officials.

KENTUCKY

Frankfort—The Workmen's Compensation Bill was recently signed by Governor A. O. Stanley. It will become effective on Aug. 1. Kenneth Meguire, of Louisville, president of the Harlan Coal Co., was one of the principal advocates of a compensation bill.

Jenkins—Increases are being made in the plant of the Consolidation Coal Co. here. April will see a big increase in the tonnage.

Harlan—A large mining plant is being installed by Wilson & Broger, on the Hall development, reached by the Wasioto & Black Mountain R.R., a branch of the Louisville & Nashville system.

Whitesburg—The Norfolk & Western Railroad Co. has issued an official denial of recent press reports that it would build an extension into Pike and Letcher Counties, Kentucky.

Barbourville—The Brush Creek Mining and Manufacturing Co., which for several years has had a petition pending with the Interstate Commerce Commission for an adjustment of freight rates, has been placed in the hands of a receiver, John E. Shepherd, of Covington. It has obligations of about \$80,000 it is said. It is owned by Jellico, Tenn., interests.

Pineville—The White Star Coal Co., organized by the Moss interests, plans to open its development on a spur of the Wasioto & Black Mountain R.R., in Harlan County, May 15. This company has a 9-ft. vein of solid coal with slate roof and floor.

OHIO

Sant—It is reported that a vein of No. 2 Wellston coal was discovered recently on the Harley Davis farm, while a gas line was being laid. If investigation discloses a good vein, arrangements will be made to operate it.

Columbus—Nicholas D. Monsarrat, formerly manager of the Sunday Creek Coal Co., has been appointed by the Federal court as receiver of the Continental Coal Co., under \$25,000 bond. Application for the receivership was made by the Guarantee Trust Co., of New York, on behalf of the bondholders, and was consented to by the company, following default in interest on \$1,569,000 of bonds. It is understood that the mines of the company, which have been operated by the Sunday Creek company under lease, will be reopened under the receivership and operated actively.

Martins Ferry—The stripping of coal is now becoming common in Jefferson County and will soon spread to all parts of the state. Three strip mines are now producing coal and about half a dozen others will begin to mine by this method in the near future.

INDIANA

Indianapolis—The Vandalia Coal Co., the largest in the state, has recently put in operation again the Lattas Creek mine, the tipple of which was destroyed by fire several weeks ago. Time was gained by removing the tipple from an abandoned property in the same field. It adds 1,300 tons a day to the company's output.

Vincennes—Edwin D. Logsdon, Indianapolis, president of the Indian Creek coal mine at Bicknell, was arrested recently by the county sheriff, charged with failure to provide free wash houses for the miners, under the Indiana law. The superintendent of the mine was fined \$300 a short time ago on a similar charge. The mine provides wash houses, but charges the miners \$1 a month each for their use.

ILLINOIS

Glen Carbon—The Madison Coal Corporation is enlarging the shaft of mine No. 2 at Glen Carbon, and will install larger self-dumping cages and new top works.

Belleville—A movement has been started to have the miners of the Belleville district reject the 3c-a-ton wage increase agreed upon by the Miners' National Convention, because of

the destructive effect this would have on competition with the Southern coal fields of Illinois, which have wage advantages.

The Tower Grove mine has been closed indefinitely following a walkout of 22 miners, ordered by Edward Dobbins, of the executive board of the United Mine Workers of Illinois, because officials of the mining company refused to reinstate an engineer who was discharged after being found asleep while on duty.

Eight coal mines, operated by the Southern Coal, Coke and Mining Co., together with their equipment and coal-land holdings and leases, will be sold at auction at the Courthouse door in Belleville, Ill., Apr. 13, by order of the Circuit Court. The sale is purely formal and is the necessary method of carrying out plans formed in connection with the reorganization of the company several years ago, which have been hindered by litigation. The property will be sold by the Southern Coal and Mining Co. and will be bought in by the Southern Coal, Coke and Mining Co., which is the reorganized company.

Springfield—The Peabody Coal Co., of Chicago, is closing down for the spring and summer many of the mines in the Springfield district, which it controls, because of the lack of demand. Duncan McDonald, secretary and treasurer of the miners' union of Illinois, states it is probable several hundred miners will be idle as a result.

Steps toward closing the receivership of the Williamsburg Coal Co. are being taken by H. J. Linkins, the receiver, who has filed his final report in the Circuit Court, and has asked the court to direct the payment of \$1,010 by former Master in Chancery Pfeifer to the receiver, to be used in paying off the mine's employees. The money was received by Pfeifer from the sale of the mining company's property under foreclosure in a case brought against the company by the Sangamon Loan and Trust Co. Judge Creighton has ordered all parties to show cause Apr. 8 why a final decree of distribution should not be entered.

Hillsboro—A temporary injunction recently obtained by the Shoal Creek Coal Co., restraining several attorneys from collecting a judgment for \$6,308.19, obtained by Mrs. Marie Romani against the company for the death of her husband, until their respective rights could be adjusted, has been dissolved and the interpleader suit brought by the company for the purpose of learning who is entitled to the money has been dismissed by Circuit Judge Jett on the ground that jurisdiction lies in the county where the judgment was obtained. The company will renew the action in Cook County. This is a case in which different attorneys who represented the widow at one time or another have filed claims which, if allowed, will entirely wipe out the amount of the judgment, leaving nothing for the widow. The coal company is ready to pay the judgment but does not know who to pay it to.

WYOMING

Cumberland—It is reported that Cumberland Mine No. 1, which has been closed or practically closed for some time, will soon be reopened. Some of the coal which was left in the previous mining is to be taken out, as well as some new coal. This mine in the past when working full gave employment to approximately 200 men.

FOREIGN NEWS

Copenhagen, Denmark—It is reported that the Russian Government has purchased for \$20,000,000 from Norwegian and American interests, large coal properties at Spitzbergen. This coal will be used on the Murmansk Ry. and for the new naval station on the Murmansk coast. Mining operations under Russian control will begin shortly.

London, England—It is reported that the South Wales coal miners and operators have agreed to the nomination of a conciliator by Walter Runciman, president of the Board of Trade, in connection with the points in dispute between miners and operators which threatened to develop into a strike. The miners' grievances are regarding Sunday work and bonuses.

PERSONALS

C. C. Wright has been appointed chief engineer of the Allen & Garcia Co., of Chicago.

John T. Hagin has bought 5,000 acres of land in Blount County, Alabama, from the Elliott Chapman Coal and Coke Co.

George M. Furness, formerly of Johnstown, has been made mine superintendent of the Poland Coal Co. with works in Greene County, Penn.

E. R. Martin, of the Lumaghi Coal Co.'s sales force, at St. Louis, was a delegate to the Missouri Democratic State Convention, held in St. Joseph, Mo., on Mar. 22.

F. Landstreet has severed his connection with the Punxsutawney Coal Co. and associated himself with Swayne & Co. in the sale of bituminous and gas coals from Pennsylvania and West Virginia.

It is reported that David Lloyd, of Scranton, district superintendent for the Coal Department of the Lackawanna, is to be made assistant general manager. Mr. Lloyd has refused to verify these reports.

Frank A. Kearnes, of Welch, W. Va., has resigned his position with the G. A. McAbee Powder Co., to become general manager of the Bengal Coal Co., of Logan County. He will be succeeded by E. W. Wenner.

Fred M. Sackett, president of the North Jellico Coal Co., has presented his resignation as secretary of the \$300,000 Louisville Auditorium Association, which purposes building a public auditorium in Louisville, Ky.

Richard Morris, foreman of the Seminoe operation of the Allegheny River Mining Co., has been appointed superintendent of the Furnace Run operation, vice James Ewing, resigned. This is effective Apr. 1, 1916.

E. F. Saxman, of Philadelphia, Penn., has resigned as vice-president and general manager of the Ebensburg Coal Co., operating at Colver, Penn., one of the largest and most modern bituminous coal mines in the state, effective at once.

Mrs. J. E. Fellows has been appointed manager of the coal properties of John E. Miller & Son, at Port Huron, Mich. The firm has 600 ft. of dockage with modern facilities for fueling vessels. Mrs. Fellows succeeds her husband, who died Jan. 28.

J. E. De Bergh, of the Knickerbocker Fuel Co., attached to the Philadelphia office, has been promoted to a position in the New York office of the company. Leonard W. Warner, well known in the Philadelphia coal trade, will succeed to the vacancy in the Philadelphia office.

G. C. Smith has been appointed general sales agent of the Stafford Coal Co., which is located in the Stock Exchange Building, Philadelphia, Penn. This company has recently taken over by purchase the mining properties of the New Central Coal Co., in the Fairmont district, and the entire output will be handled in this territory.

C. Tyson Kratz has been appointed by Governor Brumbaugh of Pennsylvania as a member of the commission authorized by the last legislature to investigate the retail price of anthracite following the imposition of the tax in July, 1913. Mr. Kratz takes the place of Thomas Martindale, the Philadelphia grocer, who declined the post.

H. V. Brown, formerly with the Pneumo-Electro Machine Co., of Syracuse, N. Y., recently purchased the Cherry Tree Machine Co., formerly the Cherry Tree Iron Works. This plant is being rapidly put into operating condition and a corps of engineers and draftsmen have been working out designs for some time for mining machinery to be manufactured at the plant.

S. Makagawa, of Tokio, Japan, a prominent official of the Japanese Bureau of Mines, is spending some time in inspecting the mines and equipment of the Consolidation and other coal companies in West Virginia. Mr. Makagawa has been in the United States five months, and after spending a year in this country will go to England to devote a similar period to studying mine methods employed there. He has been sent abroad by the Japanese Government to study safety methods in connection with mine operation.

OBITUARY

H. K. Wick, coal operator of Youngstown, died at Buffalo, N. Y., Mar. 24, while on a visit to his Buffalo office.

Thomas Moffatt, Sr., one of the oldest coal operators in Illinois, died at his home in Sparta recently, of heart failure, at the age of 80 years.

William Ringheiser was killed at Maple Hill colliery, Shenandoah, Penn., on Mar. 22, and his brother George, a councilman from the first ward, narrowly escaped a similar fate when a blast blew through upon them from the next breast. The dead man was a former police lieutenant. He was working in the mines temporarily, expecting an appointment on the Philadelphia police force next month.

TRADE CATALOGS

Lobdell Car Wheel Co., Wilmington, Del. Bulletins. "Car Wheels and Axles." Illustrated.

The National Tube Co., Pittsburgh, Penn. Catalog. "Ke-wanee Unions and Specialties." Illustrated, 72 pp., 5x8 in.

Sullivan Machinery Co., Chicago, Ill. Bulletin No. 70-A. "Sullivan Rotator Hammer Drills." Illustrated, 28 pp., 6x9 in.

Lidgerwood Mfg. Co., 96 Liberty St., New York. Bulletin No. 15. "Electric-Mine Hoists." Illustrated, 30 pp., 9x12 in.

Stromberg-Carlson Telephone Mfg. Co., Rochester, N. Y. Bulletin No. 1000. "Mine-A-Phone." Illustrated, 16 pp., 8x10 in.

Link-Belt Co., Chicago, Ill. Book No. 213. "Elevators, Conveyors and Machinery for Handling, Preparing and Storing Gravel, Stone, Sand, etc." Illustrated, 80 pp., 6x9 in.

A. S. Cameron Steam Pump Co., 11 Broadway, New York. Bulletin No. 110. "Duplex Pumps." Illustrated, 36 pp., 6x9 in. Bulletin No. 154. "Centrifugal Pumps." 16 pp., 6x9 in.

Link-Belt Co., Philadelphia, Penn. Book No. 249. "Insuring the Coal Supply." Illustrated, 24 pp., 6x9 in. Book No. 240. "Wagon and Truck Loaders." Illustrated, 62 pp., 6x9 in.

INDUSTRIAL NEWS

McArthur, Ohio—The Hocking Development Co., of Columbus, has purchased the property formerly known as the Starr-Hocking mine.

Ellington, Ill.—The coal docks of the Vandalia R.R. here were practically destroyed by fire, Mar. 25, with \$15,000 loss. Spontaneous combustion is believed to have been the cause.

St. Louis, Mo.—The Southern Coal, Coke and Mining Co., of this city, has added to its sales force Walter Gage, formerly with the Chicago & Carterville Coal Co., of Chicago. Mr. Gage will cover western Iowa and Nebraska.

Zanesville, Ohio—The Kehota Mining Co. has been incorporated with a capital of \$125,000 to mine and sell coal. The incorporators are John Winefordner, Clifford Winefordner, Frank E. Haas, Frank R. Meyer and E. M. Kirk.

Mullins, W. Va.—The contract for building ten houses for the Trace Fork Coal Co. was recently awarded to J. L. Early, of Mullins. This will make an addition of 20 houses to the company's property since the first of the year.

Youngstown, Ohio—The Witch Hazel Coal Co. has made arrangements to increase its capitalization from \$10,000 to \$75,000, for the purpose of enabling it to secure additional funds, with which its holdings of coal lands will be increased.

Malvern, W. Va.—The Fairmont & Mononga Coal Co. recently closed a deal for 8,000 acres of coal land in Marion and Monongalia Counties, paying a sum of approximately \$600,000. Within four months the company expects to operate mines on these holdings.

Princeton, W. Va.—It is generally understood here, but lacks official confirmation, that the Virginian survey into the Buchanan coal fields has been abandoned. It was reported also that the survey under way in the eastern Kentucky field has been given up and the survey forces disbanded.

Philadelphia, Penn.—Captain Theodore Krum, former owner of the steamship "City of Philadelphia," has had five coal barges built on the Great Lakes and as soon as the ice clears they will be towed to the Atlantic seaboard by his recently purchased tug, "W. W. Taylor," and placed in the coal service.

Knoxville, Tenn.—It is understood that P. Edward Keiley, of Atlanta, Ga., in his recent purchase of the property of the Turley Coal Co., at Turley, Tenn., from the receivers, is being backed by the Coca-Cola Co. of America, which will furnish ample funds for the improvement and operation of the property.

Pittsburgh, Penn.—A partnership has been formed by Louis T. Blum and William Archie Weldin, both civil engineers, under the firm name of Blum, Weldin & Co., engineers and surveyors. Offices of the new firm are located in the St. Nicholas Building, Fourth Ave. and Grant St., Pittsburgh, Penn.

Washington, D. C.—The recent bill which passed the House authorizing the Secretary of the Interior to lease Government-owned mineral-bearing lands for periods of 20 yr., has

been favorably reported on by the Senate Public Lands Committee, with an amendment, omitting coal lands from its provisions.

Knoxville, Tenn.—The Southern Appalachian Coal Operators Association has brought a complaint with the Interstate Commerce Commission against the Southern Railway Co., seeking a rate adjustment so that its members may compete, it is declared, on shipments south with the Bon Air field, north of Tullahoma, Tenn.

Provo, Utah—The Utah Power and Light Co. will start construction shortly on a 75-mi. power-line, extending from Provo south and east into Carbon County. Current will be carried at 44,000 volts, and power furnished to the United States Fuel and other companies. M. Cheever, chief engineer, and party, have returned from a trip of inspection over the proposed route.

Hindman, Ky.—The Hindman-Beaver railroad will build a line 20 mi. long from Jones' Fork through an extensively rich coal field in Knott County to Hindman, the construction to start some time in April. Rights of way are reported as being secured. This will be the most important railroad line planned in eastern Kentucky in years—especially from a coal and timber standpoint.

Kansas City, Mo.—The Mackie Clemens Coal Co. announces that two new mines have been put down recently and that work on two additional ones will begin the first of April, while still another will be opened on May 1. Two of these are on the Katy line, one on the Frisco and one on the Santa Fe, while the mine which will be developed in May is on the local route of the Frisco.

St. Louis, Mo.—The Interstate Commerce Commission will hear oral argument in this city, Apr. 14, on the complaint of the Coal Operators' Traffic Bureau of St. Louis against the Terminal Railroad Association et al., involving allowances and divisions paid by commercial carrying roads in the Illinois field, which own or control mines which they serve. The legality of certain allowances is challenged.

Williamson, W. Va.—A deed has been filed in the County Clerk's office, whereby Thomas West acquires the interest of Alexander Stafford in the 1,400-acre tract of coal land opposite the mouth of Gilberts Creek, on Guyan River. This property is believed to be one of the most valuable undeveloped tracts of coal land in the county on account of its peculiar location and the quantity and quality of the coal underlying it as well as the evidence of oil and gas, which it exhibits.

Boston, Mass.—It is reported that a group of 15 local business men of Boston have incorporated a company to be known as the Boston Steamship Co., with 10,000 authorized shares. James W. Balcomb is president, Joseph S. Donnell, treasurer, Donald M. Hill, clerk. These and Arthur S. Webster are the incorporators. Each of the 15 investors has agreed to put up \$100,000 for the purchase or the exercise of options of two new steamers to be built by the Chester (Penn.) Shipbuilding Co.

Philadelphia, Penn.—Scarcity of tonnage is being felt by the Bureau of Supplies and Accounts of the Navy Department. Because of high freight rates and the great demand for tonnage, the Government is experiencing trouble in finding sufficient bottoms to transport coal to the various naval stations. For the first time within the knowledge of a number of men on the floor of the Philadelphia Maritime Exchange, the Government is asking for bids for the transportation of about 5,000 tons of coal from the Atlantic Coast to the naval depot at Tiburon, Calif.

Columbus, Ohio—Considerable interest is manifest by Ohio coal men in the announcement which came out of Washington, D. C., to the effect that the Interstate Commerce Commission will investigate coal freight rates from mines in Ohio, Pennsylvania, West Virginia, Kentucky and Maryland to Lake Erie ports. The hearing will start Apr. 24. Formal complaint on the rates in eastern Ohio districts has been made by the Pittsburgh Vein Operators' Association. It is announced by the commission that many informal complaints have been received. It will open the entire question of coal freight rates in central traffic territory.

Philadelphia, Penn.—Orders calling for the construction of 1,000 steel hopper coal cars, aggregating an expenditure of between \$1,250,000 and \$1,500,000 were placed by the Philadelphia & Reading Ry. Co. on Mar. 24. The cars will be of 100,000 lb. capacity each and will be built by the Standard Steel Car Co. and the Pressed Steel Car Co., each of which concerns has received an order for 500 cars. The new cars will be rushed to completion as soon as possible, so that they may augment the railway's present coal-carrying equipment that is now taxed to its capacity, owing to the heavy traffic. Additional orders, it is expected, will be placed in the near future.

Market Department

General Review

Continuance of operations at anthracite collieries causes a break in the market. Numerous uncertainties in bituminous create a mixed situation. Exports heavy. Lake shippers anxious for the opening. Middlewestern market softer and production heavily curtailed.

Anthracite—There were heavy cancellations of orders when it was announced that the miners would continue at work pending further negotiations on the new wage scale, as a suspension of mining had been anticipated. The larger steam users generally have a substantial surplus on hand and have withdrawn from the market, temporarily, at least. No spring reduction was made on Apr. 1, and dealers are curtailing their purchases down to their immediate requirements. The question of future prices is causing much concern and it is clear that no spring reduction can be anticipated before May 1 at the earliest, the question hinging largely on how soon a settlement of the wage scale is effected.

Bituminous—Reports from the labor conferences, railroad embargoes, and the paucity of marine transportation both foreign and coastwise, continue the dominating features in the soft-coal market. More or less stringent embargoes continue against rail shipments to down East points, and New England consumers are still generally forced to rely on water transportation for emergency supplies. The plentiful supply at those centers obtaining a free movement from the mining regions has placed the consuming interests in a strong position in those sections. The sales agencies are exerting special efforts to keep coal moving in order to maintain the mine organizations intact; the feeling is general that an active demand will develop shortly and the companies are making special efforts to keep the operating departments tuned up to the highest efficiency. New contract prices are on a definitely higher basis, and it is understood that a fair amount of business has already been concluded.

Exports—The foreign movement continues on a large scale despite the constantly advancing freight rates. Shipments over the Hampton Roads for last week reached the second highest level since the record breaking boom of last August when the movement was just missing the 400,000-ton mark. Shipments to South American ports have been especially heavy. With the grain trade falling off during the summer months, it is possible that more vessels may be available for the coal traffic, and it is also possible that more reasonable rates may be obtained. In spite of the fact that there is a rather excessive accumulation of coal at most of the tide-water piers, some of the large shippers are still occasionally short of certain specified grades.

Lake Market—The transitional stage, pending the opening of Lake navigation, finds the market rather weak, with operators anxiously looking forward to the Lake demand to relieve the pressure on the market. All indications so far are for a fairly early opening, and there will doubtless be a heavy rush of coal when the movement gets fully under way. Vessel rates to upper Lake points are very stiff. The chief interest in the current market centers on the transportation difficulties which are so acute that shippers are not prepared to make any positive guarantees of deliveries. Prices in the prompt market are consequently more or less nominal, and it is felt that those recently named in the Pittsburgh district were too low, considering that it may yet be several weeks before transportation improves.

Middle West—The market is definitely easier, except on the Indiana grades, where buying has been mildly stimulated by the uncertainty as to whether the miners will ratify the wage agreement. With the advent of the spring weather, the domestic demand has about ceased, while steam consumers are beginning to use up their surpluses. As a result, production is heavily curtailed, and it is understood that quite a number of mines will shortly suspend operations for the summer. The contract market is firm, and it is now generally agreed that the range of prices on this business will be about 10c. per ton above last year.

A Year Ago—Anthracite buying lacks the customary vigor that should characterize the opening prices. Bituminous continues dull, and contracting is slow. Current sales substantially below normal, and some agencies are attempting to force the market.

Business Opinions

Boston News Bureau—If any one studies the situation closely from day to day, there is not much satisfaction to be derived. Uncertainty is the regulating feature. What prospect there is for peace in Europe is based upon hope rather than upon any tangible development, especially in view of the fresh declaration of the allies that the war will not stop short of complete victory. To certain people fear of a collapse of Germany may be a restraining influence, and to others the coming republican presidential nomination. It is the unknown rather than the known that disturbs sentiment. Money remains abundant and will be even more liquid after the quarter day. There is a great absence of knowledge regarding the situation, and today this is impressive in an unusual degree.

Iron Age—Signs of a more conservative spirit are beginning to appear in the steel trade, with intimations that the crest of the wave of price advances has been reached or is near at hand. Sentiment inclines no less strongly to the belief that the mills will be crowded for all the year, but there is less excitement and buyers are not as indifferent to the effects of high prices. War demand is not as insistent, partly because of the long time for which mills are sold. But there is the definite statement from agents of Great Britain that they will now place no contracts for machining shells for more than three months ahead. In several quarters in the machine tool trade the pressure is not so great. Some manufacturing consumers of iron and steel, driven for months by the fear of a shortage of material, have large stocks and many inventories have doubled.

Dun—Reports continue remarkably uniform regarding manufacturing progress, but, in many sections, development of spring business at retail is temporarily checked by inclement weather, which also restricts building operations and proves a drawback in other directions. Winter stocks, however, have undergone exceptional depletion, and, with favorable conditions prevailing, distributive trade should make rapid headway during the new season. Though prices are unusually high, the purchasing power of the people is steadily augmented by increased pay rolls and special distributions, the strengthened financial position of consumers being reflected in the pronounced preference for the better grades of merchandise. Commercial failures this week in the United States, are 380 against 327 last week, 377 the preceding week and 503 the corresponding week last year.

Bradstreet—A tale now rather commonplace is told by this week's reports. The preeminent characteristic is unprecedented activity in all of the larger lines, distributing as well as manufacturing, with, however, a rift or two in the steady, easy outflow being furnished by inclement weather retarding retail trade in the east, by growing concern over high prices and by the less pleasant aspect of Mexican affairs.

Dry Goods Economist—The principal developments of the week have been the accentuating of the freight congestion and the scarcity of merchandise. Mills producing piece goods of all kinds, knit goods, etc., are making every effort to increase their output. Little can be done in this direction, however, not only because of the scarcity of dyes, but also on account of inability to obtain a greater number of operatives. Thus the conditions as regards supply and demand may be summed up in the statement that distributors are "buying deliveries."

American Wool and Cotton Reporter—A big movement in scoured wools has been the feature of the week under review. The worsted mills, early in the season, bought a big supply of B-supers in the grease so that only a small supply was left on hand. Another prominent feature of the market is the stiffening of all holders on low wools for blanket and woolen purposes. Owing to the firmness of the wool growers in the West, it is predicted that much wool will be shipped to the dealers on consignment.

Marshall Field & Co.—Current wholesale distribution of dry goods shows a large increase over the corresponding period of a year ago. Road sales continue to exceed those of a year ago, for both immediate and future delivery. More customers have been in the market during the week. Collections are ahead of the same period last year. The cotton market is strong, and prices are advancing.

ATLANTIC SEABOARD

BOSTON

Light spot demand for Pocahontas and New River in the f.o.b. market. Production maintained in order to retain labor. Demand still active for inland delivery. Georges Creek contract prices rumored. Anthracite deliveries slow but demand begins to slacken.

Bituminous—Dumpings at Hampton Roads are restricted by the shortage of marine transportation. Those factors who have boats of their own are able to buy Pocahontas and New River of the best grades at prices down to \$2.75 f.o.b., but because most of these interests are obligated to take coal on contract the spot market is very light. Then, too, in more than a few instances coal on contracts beginning Apr. 1 is to cost the buyer less than on the contracts just expiring, and that has a further tendency to make receipts here of Hampton Roads coals much less than usual. On the other hand, the agencies are extremely anxious to keep coal moving in order to prevent labor from going to other regions.

For inland delivery from points like Boston and Providence the active inquiry for these coals continues, although perhaps on a more even basis than a week ago. Practically every steam-user of any consequence has burned more coal the past winter than was contracted for and the result is a steady demand for part cargoes at practically all the distributing points. The embargoes against all-rail shipments, has been another important factor in this territory. For emergency supplies practically all of New England has been forced to rely on tide-water coal. Stocks are light in all directions and the marvel is that New England got through March as well as it did.

While Georges Creek is apparently in no better supply either at Baltimore or at Philadelphia, regular receivers of that grade are understood to have been offered contracts for the year beginning Apr. 1 on a basis 15c. higher than last year f.o.b. vessel, making the new price \$3 f.o.b. Baltimore. At the mines \$2 has been named as the probable contract figure.

The agencies for the Pennsylvania steam coals continue their active canvass for season orders. The prices first announced have been somewhat modified and already a fair amount of business has been closed. There has been considerable shifting on the part of buyers from one shipper to another on account of service during the winter but it is likely that the tonnage, particularly that all-rail, will be distributed among the various factors about as usual. Certain shippers who are in position to make deliveries both all-rail and from tide-water are using the railway congestion that has prevailed all winter as an object lesson and are guaranteeing to keep plants supplied from tide-water if the service breaks down all-rail. If this form of contract were generally taken up with it would narrow down the competition to a very few concerns. F.o.b. Philadelphia and New York and on cars at eastern points the Pennsylvania grades so far have shown no recession in price.

Anthracite—Shipments have not improved but clearer skies are counted on to make the coastwise movement better, and higher temperatures will slow up the demand. Dealers in New England were running very close to the danger line early in March and the long spell of cold weather completely upset their calculations. Retail trade, therefore, has been a hand-to-mouth affair, with surprisingly little interest on the part of the public in a possible suspension of mining that the trade up to recently considered probable Apr. 1.

Broken is the size in shortest supply at the moment, although the steam sizes are not far behind in the demand. Now that no reduction in price is to go into effect until an agreement is reached between operators and mine-workers, New England buyers with all their anxiety for shipments are now proceeding very cautiously. The smallest chance that coal in May or June will be less in price than today is enough to dull their interest in accumulating supplies for a demand that may be months off.

Bituminous prices, f.o.b. loading ports at points designated, are about as follows, per gross ton:

	Philadelphia	New York	Baltimore	F.o.b.	Mine
Clearfields.....	\$2.65@3.00	\$2.95@3.35	.....	\$1.40@1.75	
Cambrias and Somersets.	2.80@3.30	3.10@3.60	.....	1.65@2.00	
Georges Creek.....	3.75@3.80	4.00@4.10	.....	
Georges Creek (contract)	3.07@3.17	3.37@3.47	\$3.00@3.10	\$2.00	

Pocahontas and New River are quoted at \$2.75@2.85 f.o.b. Norfolk and Newport News, Va., and on cars at Boston and Providence, \$5.25@5.75.

NEW YORK

Anthracite market easier. Demand continues fair and prices stationary. Call for buckwheat heavy. April business prospects bright. Bituminous demand normal but trade anxious for settlement of wage agreement.

Anthracite—The announcement that the miners would continue at work after Apr. 1 pending the signing of a new wage agreement has caused a better feeling and there have been more orders received by shippers. Dealers now realize that no spring reduction is to be made, at least not until later in the season and are placing orders for sufficient coal to supply their customers. Indications point to good business the first part of April as stocks are low. At tidewater orders are plentiful but there is considerable delay in delivery, due both to frozen coal and the scarcity of small boats. The call from New England and Long Island Sound points has been urgent.

The demand for the prepared sizes is about evenly divided. Holders of premium coal are having trouble in getting rid of it and frequently are forced to sell at company circular. The greatest call is for the steam coals. Pea coal is strong at from \$3.75 to \$4 f.o.b. Quotations on buckwheat last week were at \$5.25 alongside while early this week they dropped to from \$3.35 to \$3.75 f.o.b., according to quality.

Current quotations at the lower ports gross tons, f.o.b. Tidewater follow:

	Circular	Individual	Circular	Individual
Broken.....	\$5.05		Pea.....	\$3.50 \$3.75@4.00
Egg.....	5.30	\$5.30@5.30	Buck.....	2.75 3.35@3.75
Stove.....	5.30	5.30@5.30	Rice.....	2.25 2.50@2.75
Nut.....	5.55	5.55@5.55	Barley.....	1.75 2.25@2.50

Quotations from the upper ports are five cents higher on account of the difference in towing rates.

Bituminous—The bituminous coal market is in fairly good condition. Prices are some lower than a week ago but the demand remains good and loading is better. Supplies are not large here while shipments to line dealers are slow on account of the freight congestion. The failure of the operators and miners of Central Pennsylvania to come to an agreement is causing some uncertainty. Many large contracts remain unsigned, and those concluded have been at from 25 to 30c. higher than last year's prices.

The embargo situation is practically unchanged. Strenuous efforts are being made to keep New England in fuel and for this purpose the railroads frequently lift the embargoes for a day at a time. Water freight rates are strong and in the New York harbor 40c. is the average price asked. Shippers are having difficulty in keeping up deliveries on contracts.

Demand at Tidewater is normal but deliveries are greatly delayed and loaded boats are quickly picked up at better prices than prevail for f.o.b. coal. Current quotations, gross tons, f.o.b., Tidewater for the various grades follow:

	South Amboy	Port Reading	St. George	Mine Price
Georges Creek Big Vein..	\$3.75@4.00	\$3.75@4.00	\$3.75@4.00	\$2.25@2.50
Georges Creek Tyson.....	3.35@3.60	3.35@3.60	3.35@3.60	1.80@2.05
Clearfield: Medium.....	3.25@3.50	3.25@3.50	.....	1.70@1.95
South Forks.....	3.50@3.75	.....	.....	1.95@2.20
Nanty Glo.....	3.35@3.60	.....	.....	1.80@2.05
Somerset County: Me- dium.....	3.25@3.50	3.25@3.50	3.25@3.50	1.70@1.95
Quemahoning.....	.....	3.45@3.60	3.45@3.60	1.90@2.05
West Virginia Fairmont 1/4	.....	3.10@3.20	3.10@3.20	1.35@1.45
Fairmont mine run.....	3.00@3.10	3.00@3.10	3.00@3.10	1.15@1.25
Western Maryland.....	3.00@3.25	3.00@3.25	3.00@3.25	1.45@1.70

PHILADELPHIA

Heavy cancellations of anthracite orders except on pea. Old prices in effect. Tax refund under way. New freight rates overlooked. Bituminous softer with \$2 coal almost gone. Embargoes continue.

Anthracite—The market has been almost reversed by the agreement to continue work after Apr. 1 pending the final outcome of the conference. Immediately the news became known cancellations were recorded at a wholesale rate. The action of the conference was a distinct surprise, as it had been generally expected a suspension would ensue. Shippers are now accepting orders for April shipment at the circular in effect since the first of the year, but so far very few orders are being placed. With the old prices standing it begins to look as if the proposition long agitated for delaying the spring reduction until May 1 will automatically take effect at this time and may remain fixed at that period for future years.

The sizes most affected by the falling off of orders are the steam grades, as most manufacturers have six to eight weeks' supply on hand. However, the question of new prices is causing some concern, as all contracts expired with the last of March and the shipping interests have not quoted new prices as yet. Shipments made in April will probably take last month's prices. Pea coal is the one exception as dealers seem convinced that this size will be abandoned and are accumulating every possible ton they can at \$2.55 at the mines.

LAKE MARKETS

PITTSBURGH

Market unchanged. Prospects of Lake movement.

The market shows no material change, and is rather a dragging affair. Operators are now counting the time until the opening of Lake navigation, expecting the resumption of shipments on a large scale to turn the balance in favor of the sellers of coal, buyers meanwhile being very reserved in the matter of making contracts and calling for very little prompt coal.

There have been heavy rains over the lower Lake region and the ice has been clearing very well, but at the Soo conditions as to ice are no better than normal at this date. The first shipments of ore from the head of the Lakes will probably be within a few days of Apr. 25, the average date, and it is doubtful if much coal will go up until after the boats have brought down their first ore cargoes. Domestic demand is very light. We quote: Slack, \$1.10@1.15; mine-run, \$1.15@1.25; 3/4-in., \$1.25@1.40; 1 1/4-in., \$1.35@1.50, per net ton at mine, Pittsburgh district.

BUFFALO

Difficult to get cars moved; embargoes off one day, on the next. Cheap Southwestern coal still coming in. Anthracite quieter.

Bituminous—The shipper pays small attention to anything but the movement of cars. If an order comes in an effort is made to get the railroads to ship the cars, but there is no knowing how long it will take. There is still some cheap Southwestern coal coming here. Most of it has been cut off, but shippers are finding sales of it at \$1 for mine-run and \$1.15 for three-quarter. The Pittsburgh prices sent out several weeks ago are regarded as too low since it will take at least 30 days to get the roads straightened out.

Following are average contract prices of bituminous in this market:

	Pittsburgh	Allegheny Valley	Penn Smokeless
Lump.....	\$2.95	\$2.75	\$2.80
Three-quarter.....	2.85	2.60	..
Mine run.....	2.75	2.50	2.60
Slack.....	2.40	2.30	2.60

Prices are per net ton, f.o.b., except east of Rochester and Kingston, Ont., where they are per gross ton.

Anthracite—There has been a brisk trade up to this time since the steady winter set in early in February and sales have been much better than was expected. At the same time there is no expectation that April will see much coal moved. Consumers are well supplied and the amount of coal available is so small that practically all Buffalo agencies are short.

COLUMBUS

Trade fairly active, though warmer weather slows up the domestic demand. Steam business holding fairly well.

With the report current that a suspension of a week or two is very probable after Apr. 1, buying on the part of steam users has been more active. The demand is especially strong from plants making iron and steel products and other lines of manufacturing continue to expand. There is also a good demand from railroads.

The domestic trade has been rather quiet because of the warmer weather and prices in retail circles have weakened to a certain extent. Buying is mostly in small lots to piece out the trade until the stocking period arrives.

Contracting for steam tonnage is more active than for several months. A large number of steam contracts expire after Apr. 1 and since the wage scale has been settled figures are now being written into the contracts. Contracts for gas coals are being made at about \$1.05 for mine-run and \$1.15 to \$1.20 for three-quarter inch. Contracts for West Virginia splints are made at 95c. for mine-run and \$1.05 for three-quarter inch.

Operators are looking forward to a rather active Lake trade and preparations are being made to take care of a larger tonnage than was shipped last year. Boats will be scarce.

Pocahontas is growing slightly stronger in the local market. There is also a better demand for anthracite. West Virginia splints are selling fairly well but prices remain quite weak.

Hock- ing	Pom- eroy	East Ohio	Hock- ing	Pom- eroy	East Ohio
Re-screened lump..	\$1.50	\$1.60	Mine-run.....	\$1.15	\$1.15
Inch and a quarter.	1.40	1.40	Nut, pea and slack.	.90	.95
Three-quarter-inch	1.35	1.35	Coarse slack.....	.80	.85
Nut.....	1.25	1.25			.80

CINCINNATI

Market slightly improved, and prospects are good for the spring season. Current demand quiet, but prices firm.

With the contracting season under way and the opening of Lake shipments now at hand coal men are looking ahead with confidence. Demand has not been active for domestic grades and retailers have bought only in limited quantities. The various steam coals continue strong, due to the small production and the steadily improving demand. Contracting has not been especially active, but is about normal. The higher prices, necessitated by increased wages and other factors, is causing some delay. The car supply is still poor, but a full supply just now would mean an excess supply of coal.

DETROIT

Steam consumers show little interest. Little buying of domestic grades. Shippers offer a 40c. rate to Milwaukee by Lake route.

Bituminous—In the general market, buying is not active nor on a large scale, though prices are holding steady. Small sizes are in the best demand. A small improvement in the domestic trade followed the heavy snowfall last week but was of short duration failing to add materially to the business. Speculative coal is plentiful but it is being handled without much cheap tonnage getting on the market. In the general trade, prices are fairly steady, aside from short fluctuations.

Anthracite—Weather conditions have reduced the buying of anthracite for household use and retail yards are taking only sufficient for current demands. Embargoes on the Grand Trunk have retarded transfers to that in Buffalo delaying delivery to buyers in the local district. The restrictions have been modified so that cars for delivery on Grand Trunk tracks in Detroit and Windsor are now being received in a limited number from connecting roads in Detroit.

Lake Trade—Vessel owners were offered a block of 100,000 tons of coal for delivery in Milwaukee at a rate of 40c. during the week but it is not reported any contract was closed. The rate offered is 10c. higher than the going rate of last season and is five cents higher than is stipulated in contracts closed six weeks ago.

COKE

CONNELLSVILLE

Market rather inactive and prices not clearly defined, though evidently no firmer. Production and shipments decreased.

There are decidedly divergent opinions as to the state of the coke market. Transactions in spot furnace coke furnish little criterion, as the tonnage involved is small and prices show a wide range. Middle interests assert that they have been able to pick up many small lots of spot furnace coke at \$3.25, while operators point to occasional sales they have made at \$3.75 as an indication that the market is practically at that figure. Foundry coke is rather slow and it is increasingly difficult to secure \$4 for even the best grades for spot shipment, except for a carload here and there.

The contract market is equally devoid of a definite position. While we reported a fortnight ago two contracts for furnace coke, running to the end of the year, at \$3, it has since been learned that an important tonnage had previously gone through at \$2.50, and there is room for suspicion that the seller would name that price again. We quote: Spot furnace, \$3.25@3.75; contract, \$2.50@3; spot foundry, \$3.75@4; contract, \$3.25@3.75, per net ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Mar. 18 at 432,689 tons, a decrease of 25,205 tons, and shipments at 429,768 tons, a decrease of 33,476 tons.

Buffalo—The market is rather dull. Prices went too high and now something of a reaction has followed. The consumption is good, but prices cannot be uniform so long as the movement of cars is so uncertain. Quotations are somewhat lower, \$6 for best 72-hr. Connellsville foundry and \$4.85 for 48-hr. furnace, with no stock coke offering.

Chicago—Coke demands are more than shippers can take care of, and the capacity of domestic coke ovens are being taxed to the utmost extent. Prices continue as follows per net ton f.o.b. cars Chicago. Connellsville, \$6.50; Wise County, \$6.25@6.50; By-Product Foundry, \$6.50; By-Product Domestic, \$5@5.25; Gas House, \$4.75.

St. Louis—The feature of the coke market lies in the industrial consumption which continues at a satisfactory rate. Domestic movement has quieted with the approach of warm weather. A few cars of petroleum coke were moved during the week. The following prices, per net ton, f.o.b. cars St. Louis, are in effect: Byproduct (all sizes), \$5.25; Gashouse (lump and egg), \$4.50; Petroleum (lump), \$6.75.

MIDDLE WESTERN

GENERAL REVIEW

Market situation generally easier but contract prices are stronger. Production heavily curtailed.

A desultory market, devoid of any new developments has prevailed throughout the week. Domestic demand is nil with coarse steam sizes at a standstill, and the only spot coal showing any life is screenings on which prices are steadily maintained. In some cases April circular prices have been offered to move accumulated domestic sizes. Steam users have an abundance of coal to meet their requirements for 60 days and are using this up before placing further orders. Production has been heavily curtailed, so that there is no surplus of screenings. Some mines are only operating one-third time, and it is reported that a great many mines will be closed down for the summer months on Apr. 1. Mine-run is being crushed in some instances to meet the obligations outstanding for screenings.

All indications point to the Lake season opening early. It is understood that a good many of the docks are already placing contracts for fresh supplies to be shipped just as soon as conditions will permit. It is generally felt that contracts on Indiana domestic and steam coals will range at least 10c. per ton higher during the coming year, while Southern Illinois 2-in. screenings will not be sold below 90c., and Nos. 3 and 4 sizes at less than \$1.25. No. 5 washed coal will probably sell at 95c. under contract; Central Illinois grades will be held at 85c. to 90c. for fine coal, and \$1.25 for steam lump. Illinois lump, egg and nut will sell at \$1.45 for early delivery.

ST. LOUIS

Early summer dullness reigns. Demand scarce for all large sizes. Small coal moving in light volume.

The spring lull has settled firmly upon the market. The dealer is an absent factor, excepting for an occasional purchase. Domestic deliveries have virtually ceased. Industrial consumption is being supplied from the storage piles to such an extent that the buyer is virtually off the market. Screenings and small washed sizes are quiet but show a tendency for betterment and higher prices. Lump, egg, No. 1 nut and mine-run have about reached the lowest possible range of prices.

Operating time at the mines is diminishing, the maximum being three to four days per week with the minimum at some mines one day or less. Many mines are being closed indefinitely while others are contemplating a change to the co-operative basis.

Much new contract business is now upon the market. Many wholesalers and dealers are devoting their time and energies in that direction. Contract prices are on a higher plane than a year ago and those contracting early will have the advantage of the best prices.

Following is the range of quotations, per net ton, f.o.b. cars at the mines:

	Williamson and Franklin	Staunton and Mt. Olive	Mont- gomery Co.	Inter- mediate	Standard
8-in. lump..				\$1.15@1.40	\$1.00@1.15
6-in. lump..	\$1.25@1.75	\$1.25@1.40	\$1.25@1.40	1.15@1.40	1.00@1.15
3-in. lump..	1.25@1.75	1.25@1.35		1.15@1.40	
2-in. lump..	1.20@1.40	1.15@1.25		1.10@1.20	.80@1.00
1½-in. lump..	1.20@1.40			1.15@1.25	.80@1.00
6x3-in. egg..	1.25@1.75			1.25@1.40	1.00@1.15
6x2-in. egg..				1.15@1.25	1.10@1.20
6x1½-in. egg	1.20@1.40			1.15@1.25	.80@.90
No. 1 nut..	1.20@1.50			1.15@1.25	.80@.90
No. 2 nut..	1.10@1.40	.90@1.00		1.05@1.15	.75@.90
Mine run... .	1.05@1.15	1.05@1.10	1.05@1.10	1.00@1.10	.80@.90
Screenings.. .	.80@.90	.75@.90	.75@.90	.70@.80	.70@.80
Washed:					
No. 1 nut..	1.50@1.75	1.40@1.50		1.40@1.50	1.40@1.50
No. 2 nut..	1.25@1.50	1.25@1.40		1.25@1.40	1.25@1.40
No. 3 nut..	1.25@1.50	1.25@1.35		1.25@1.35	1.25@1.35
No. 4 pea..	1.20@1.40	1.15@1.25		1.15@1.25	1.15@1.25
No. 5 slack.	.80@.90	.80@.90		.75@.85	.75@.85

CHICAGO

Buying slow. Screenings steadily absorbed without change in price. Anthracite demand light. Spot smokeless somewhat stronger.

It is said that Saline County shippers will shortly market their product through the Franklin County Coal Operators Association. At this time only one or two operators in the Franklin County district are outside the fold, and the acquisition of the Saline County shippers will tend to greatly strengthen the selling plans of the organization. Scarcely a mine in the Southern field has been able to operate half time this week. Even on this basis, unsold coal has accumulated, and the accumulation is now larger than at any time during the season. Spot screenings are readily sold at from 95c. to

\$1, the supply not equaling the demand. Inquiries on steam contracts are met with quotations from 10c. to 15c. higher than last years basis.

A large number of mines will be closed down in the Central Illinois district effective Apr. 1. The demand is very dull from the Springfield mines, and steam coal consumption is slow. Screenings are well taken at 85c. per ton.

Indiana steam coal demand is a little stronger, due to fears that the wage settlement will not be satisfactory to the Indiana miners. Domestic coal is bringing around \$1.60 per ton. Contracts will generally be from 10c. to 15c. higher as the outcome of the increase in wages. Some car trouble has been experienced at the mines. A number of operations are scheduled to close down on Apr. 1 for the summer months. Screenings continue strong at from 85c. to 95c. per ton.

Smokeless continues to improve. A little spot mine-run is being offered, and most of the prepared sizes are absorbed at \$1.60. Contracting has been freely done at the new circular prices recently announced. But little Pennsylvania smokeless is reaching this territory and prices are only nominal.

The call for Hocking is slightly improved, with sales of domestic lump around \$1.50 to \$1.60.

Movement of Eastern Kentucky coals has been below normal. Prices on the domestic product take wide range. Contract quotations also vary widely, and it will take some time to develop standard prices.

Anthracite is holding up rather well, and few concessions are in evidence. Most retailers are waiting for April discount figures before placing stocking orders.

Quotations in the Chicago market are as follows, per net not f.o.b. cars, mines:

	Williamson and Franklin Co.	Springfield	Sullivan	Clinton	Knox and Greene Cos.
Lump.....	\$1.50@1.75	\$1.50@1.60	\$1.50@1.60	\$1.60@1.75	\$1.50@1.65
Steam lump	1.25@1.30	1.25@1.35	1.25@1.30	1.25@1.30	1.25@1.30
2½ and 3-in.					
lump.....	....	....	1.30@1.40	....	....
1½-in. lump.	1.30	1.30	1.25@1.35	1.35@1.45	1.30
Egg.....	1.50@1.75	1.40@1.60	1.20@1.25	1.35@1.50	1.40@1.50
Nut.....	1.40@1.50	1.40@1.50	....	1.25@1.35	1.20@1.25
No. 1 washed	1.50@1.75	....	1.50	....	....
No. 2 washed	1.40@1.50	....	1.40	....	....
No. 1 nut..	1.50@1.75	....	....	....	....
No. 2 nut..	1.40@1.50	....	....	....	....
Mine-run...	1.20@1.25	1.10@1.15	1.15@1.20	1.10@1.15	1.10@1.20
Screenings..	.95@1.00	.85@.90	.80@.85	.90@.95	.85@.95
Harrisburg		Poach. & Penna.			Hocking
& Saline Co.		E. Kentucky W.Va. Smok'l. Smokeless			
Lump.....	\$1.50@1.60	\$1.35@2.25	\$1.60@2.00	\$1.50@2.00	\$1.60@1.85
1½-in. lump.	1.25@1.30	1.25@1.30	1.25@2.00	1.60@2.00	1.50@1.60
Egg.....	1.50@1.60	1.25@2.00	1.60@2.00	1.50@2.00	1.40@1.50
Nut.....	1.15@1.60	1.40@1.75	1.40@1.75	1.40@1.75	1.40@1.75
No. 1 nut..	1.50@1.75	....	....	....	....
No. 2 nut..	1.40@1.60	....	....	....	....
Mine-run...	1.25	1.10@1.25	1.25@1.40	1.20@1.40	1.15@1.20
Screenings..	.90@1.00	.75@.85	....	....	.70@.90

INDIANAPOLIS

Mines running to full capacity of the car supply. Buying somewhat larger, owing to Indiana miners' attitude on wages. Outlook for summer bright, and higher prices anticipated.

The car situation has improved considerably and mines are making better time; all those that have sufficient cars are running full capacity. The disinclination of Indiana miners to accept the proposed wage agreement has stimulated some buying that for the time being had been postponed. But the larger consumers are mostly well stocked up and are not increasing their supplies. There will not be much market for domestic lump from now on. The lump situation already has an easing effect on screenings and 85c. is about the best obtainable for Nos. 5 and 6, f.o.b. mines.

The industrial activity in Indiana seems to be nearing its maximum. A plant not making normal time is hard to find and many are working double shifts. The outlook therefore, is much brighter than in the last two years, or more. Whether this will be reflected in better prices is not yet plain, but it is certain to result in more business.

I. C. C. DECISIONS

I. C. C., No. 7694—C. Reiss Coal Co. vs. Ann Arbor Railroad Co.

Demurrage charges, due to inadvertent cancellation of free-time provisions, collected on coal in carloads held for reconsignment at Frankfort, Mich., found to have been unreasonable and reparation awarded.

I. C. C., No. 7839—National Clay Works vs. Minneapolis & St. Louis Railroad Co.

Demurrage charges at Mason City, Iowa, on 13 carloads of coal shipped from Panama and Harrisburg, Ill., found to have been assessed unlawfully. Reparation awarded.

I. C. C.—No. 7813—Berry Coal and Coke Co. vs. Chicago & North Western Railway Co.

Rate charged for the transportation of a carload of blacksmith coal from Chicago, Ill., to Twin Falls, Idaho, not found to have been unreasonable or unjustly discriminatory. Complaint dismissed.

I. C. C. No. 7,774. Bennett & Son et al vs. Chesapeake & Ohio Railway Company et al. Portions of Fourth Section Applications Nos. 1,548, 1,747 and 1,757.

1. Rates for the transportation of bituminous coal in carloads from the Kanawha and New River districts in West Virginia to Culpeper and Manassas, Va., not found unreasonable, and the complaint dismissed.

2. The inhibition of the long-and-short-haul clause of the fourth section is not restricted to movements over the line of a single carrier, but extends to transportation over routes in which one or more carriers participate.

3. The defendants' fourth section applications which seek authority to continue lower rates on coal from the Kanawha and New River districts to Alexandria, Va., and Washington, D. C., than to Culpeper and Manassas, Va., granted in part.

PRODUCTION AND TRANSPORTATION STATISTICS

PENNSYLVANIA RAILROAD

The following is a statement of shipments over the P. R.R. Co.'s lines east of Pittsburgh and Erie for February and the two months of 1915 and 1916, in short tons:

	February				Two Months	
	1915	1914	1915	1914	1915	1914
Anthracite.....	971,580	771,173	2,108,458	1,657,406		
Bituminous.....	4,201,193	3,039,055	8,515,999	6,527,991		
Coke.....	1,129,603	741,102	2,321,335	1,425,235		
Total.....	6,302,376	4,541,330	12,945,792	9,610,632		

BALTIMORE & OHIO

The following is a statement of coal and coke tonnage moved over this system and affiliated lines during February and the previous two months:

	December		January		February	
	1915	1914	1916	1915	1916	1915
Coal.....	2,805,803	2,227,899	2,707,785	2,293,406	2,666,007	1,906,210
Coke.....	377,511	232,594	382,692	221,395	378,461	232,111
Total....	3,183,314	2,460,493	3,090,477	2,514,801	3,044,468	2,138,321

CHEMPEAKE & OHIO RY.

The following is a comparative statement of the coal and coke traffic from the New River, Kanawha and Kentucky districts in February and the eight months of the fiscal years 1915 and 1916, in short tons:

Destination	February		Eight Months	
	1916	%	1915	%
Tidewater.....	444,482	22	263,523	19
East.....	230,810	12	188,078	14
West.....	1,172,442	58	862,940	62
Total.....	1,847,734		1,314,541	
From Connections				
Bituminous.....	160,360	8	74,365	5
Anthra. (local).....	108		143	
Anthracite.....	967		819	
Total.....	2,009,169	100	1,389,868	100
Coke.....	41,352		14,309	

To	1914	1915	1916	1914	1915	1916
Russia.....	138,417			377,421		
Sweden.....	220,389			506,877		
Norway.....	244,198			159,649		
Denmark.....	202,057			196,814		
Germany.....	584,564				1,137,997	
Netherlands.....	139,634			95,347		
Belgium.....	172,828				267,046	
France.....	1,320,767				268,612	
Portugal ^a	98,217			1,237,379		
Spain ^a	293,684			219,602		
Italy.....	865,145			639,305		
Aus. Hung.....	81,904			351,677		
Greece.....	80,171			2,556,409		
Roumania.....				22,304		
Turkey.....	63,075			22,612		
Algeria.....	85,052			103,294		
Portugal ^a	23,138			77,427		
Spain ^a	31,470			71,207		
Chile.....	46,638			216,326		
Brazil.....	162,795			228,995		
Uruguay.....	64,302			84,758		
Argentine.....	190,704			152,096		
Channel Is.....	12,759			229,995		
Gibraltar.....	9,761			182,096		
Malta.....	40,019			178,443		
Egypt ^a	44,135			44,049		
Aden ^a	11,481			40,907		
India.....	18,845			52,349		
Ceylon.....	26,206			52,349		
Miscell'ous.....	113,335			70,288		
Coke.....	94,595			19,105		
Briquettes.....	154,136			19,105		
Total.....	5,974,608			19,105		
Bunker.....	1,615,132			1,301,083		

MIDDLE WESTERN ROADS

The following is a comparative statement of coal handled over the 17 principal Middle Western carriers for December, and twelve months of 1915, compared with the same periods last year:

	December		12 Months	
	1914	1915	1914	1915
Illinois Central.....	801,825	951,293	7,794,615	8,115,795
C. & E. I. R.R.....	777,984	887,476	6,954,957	6,797,834
C. B. & Q. R.R.....	633,552	727,180	5,911,239	6,021,753
C.C.C. & St. L. R.R.....	546,021	616,752	5,012,514	5,359,585
Vandalia R.R.....	502,906	606,101	4,553,990	5,057,089
C. T. H. & S. E. Ry.....	336,357	420,002	3,081,901	3,260,588
C. & A. Ry.....	218,066	236,150	1,801,699	2,094,737
Wabash R.R.....	195,315	187,171	1,633,531	1,625,771
St. L. I. M. & S. Ry.....	154,867	159,407	1,564,721	1,610,306
Southern Ry.....	109,717	151,995	1,430,554	1,291,260
B. & O. S. W. R.R.....	102,693	70,616	890,811	971,577
St. L. T. & E. R.R.....	73,143	88,508	702,692	651,439
St. L. O. F. Ry.....	75,482	82,388	565,213	685,150
L. & M. Ry.....	74,628	59,181	557,995	506,180
C. I. & L. Ry.....	51,062	83,309	561,802	711,278
C. P. & St. L. Ry.....	53,603	62,095	393,738	480,802
C. & N. W. Ry.....	48,648	50,416	361,783	429,328
Totals.....	4,775,869	5,440,040	43,773,755	45,670,562

COAL EXPORTS

Exports of domestic coal and coke from the United States, and bunker coal laden on vessels engaged in the foreign trade, at the specified districts, during the month of January, 1916, were as follows:

Districts	Anthracite	Bituminous	Coke
Maine and New Hampshire.....	116	150	2,257
Maryland.....	151	42,302	136
Massachusetts.....	8,921	893	2,567
New York.....	15,347	54,134	23
Philadelphia.....	50	2,472	3,366
South Carolina.....	.....	284,951	39
Virginia.....	.....	125	443
Mobile.....	.....	443	39
New Orleans.....	.....	7,156	13,340
Arizona.....	.....	718	.....
Eagle Pass.....	.....	5,110	1,950
El Paso.....	.....	5,402	3,244
Laredo.....	.....	.....	43
San Francisco.....	.....	67	.....
Southern California.....	.....	321	3,531
Washington.....	23	287,074	47,062
Buffalo.....	169,280	8,127	329
Dakota.....	6,185	6,655	78
Duluth & Superior.....	1,242	99,680	9,701
Michigan.....	33	66,897	1,132
Ohio.....	.....	34,339	221
Rochester.....	1,833	31,858	1,823
St. Lawrence.....	70,792	1,013	48
Vermont.....	.....	1,270	.....
Total.....	274,986	942,144	90,890

BUNKER COAL	
Gross Tons	Gross Tons
Maryland.....	28,660
New York.....	269,068
Philadelphia.....	.....
.....	31,395
.....	146,668

FOREIGN MARKETS

GREAT BRITAIN

Mar. 15—Operations are still hampered by scarcity of prompt tonnage. The coal market is, however, fully steady for early and forward loading. Quotations are approximately as follows:

Best Welsh steam.....	Nominal	Best Monmouthshires.....	\$7.20@7.44
Best seconds.....	Nominal	Seconds.....	6.72@6.96
Seconds.....	\$7.20@7.44	Best Cardiff smalls.....	4.08@4.20
Best dry coals.....	7.44@7.92	Cargo smalls.....	3.24@3.48

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport, both net, exclusive of wharfage.

Freight—Tonnage is still very short and as excessive rates are demanded, chartering is very much restricted. Rates are approximately as follows:

Gibraltar.....	\$13.20	Naples.....	\$22.20	St. Vincent.....	\$11.40
Marseilles.....	21.23	Alexandria.....	24.00	River Plate.....	13.80
Algiers.....	18.33	Port Said.....	23.40	.....	.....
Genoa.....	23.40	Las Palmas.....	10.80	.....	.....

Exports—British exports for February and the two months of the past three years were as follows:

To	1914	1915	1916	1914	1915	1916
Russia.....	138,417			377,421		
Sweden.....	220,389			500,877		
Norway.....	244,198			396,037		
Denmark.....	202,057			329,704		
Germany.....	584,564			1,137,997		
Netherlands.....	139,634			268,612		
Belgium.....	172,828			205,964		
France.....	1,320,767			2,644,038		
Portugal ^a	98,217			2,674,965		
Spain<						